Les intéraction directes et indirectes entre idéologie et croissance économique. Cinq essais appliqués au cas français, 1870-2011

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The Direct and Indirect Interactions between Ideology and Economic Growth

Five Essays applied to the French Case, 1870-2011

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FOREWARD

This Ph.D. dissertation, entitled “The Direct and Indirect Interactions between Ideology and Economic Growth”, brings together five essays in the field of macroeconomics of growth. The links between those different essays and the underlying logic of the whole dissertation is explained in the General Introduction in which we also define the questions of research we address. Nevertheless, since each essay corresponds to an independent paper, essays can be read separately. This implies the presence of redundant information across essays.

ABSTRACT

This Ph.D. dissertation seeks to investigate the links between the individuals' political ideology and economic growth. First, because individuals' social norms are supposed to influence the long-term economic growth, we are interested in how the political dimension of these norms affects a country's economic performance. In this context, we ask whether political ideology directly influences economic growth or indirectly, through transmission channels embodied in the policies for which the individuals vote. As a country's ideology can be defined as the society's choice regarding the appropriate level of the government intervention in the economy, we also ask whether the government intervention works as a transmission mechanism in the ideology-economic growth relationship. Second, to the extent that individuals' electoral behaviors reveal their political ideology, we study the impact of economic growth on the voters' ideology. More precisely, we aim to investigate how economic growth affects electoral behaviors. Therefore our goal is two-fold. We want to improve the understandings of the role played by the individuals' ideology in the process of economic growth and to enrich the economic growth literature. We also want to participate in the research on the determinants of the change in the individuals' ideology and beliefs. For that, we use a novel and comprehensive database covering all the French democratic experience since 1870. We also construct similar historical data for the U.S. and the U.K. but this dissertation is mainly applied to the French case. Studying individual countries over long periods of time, we use time-series analyses with annual data. Our results identify a causal effect from political ideology to economic growth all over the French democratic experience. We find that a move of the voters' ideology to the right impacts the long run economic growth positively. We also find that the growth effect of ideology is mediated by the size of government in the post-second-world-war period but not in the pre-war period. Therefore, our results suggest a direct effect of political ideology on economic growth in the pre-war period but an indirect effect in the post-war period. We find that the contrasting role of government size as a transmission mechanism before and after the Second World War can be explained by

changing relationships between ideology and government intervention on the one hand and between government size and economic growth on the other hand. Our results also identify that the economic growth does not shift the country's ideology towards the left or the right. Nevertheless, we also find that economic growth influences the voters' ideological instability in the sense of a general change in the voting patterns.

Keywords: Ideology, Economic Growth, Government Size, Nonlinearity Hypothesis, Baumol Cost Disease, Electoral volatility, Economic Voting, Time-series, France.

RÉSUMÉ

Cette thèse cherche à étudier les liens entre l'idéologie politique des individus et la croissance économique. Premièrement, étant donné que les normes sociales des individus sont supposées influencer la croissance de long-terme, nous nous intéressons à la façon dont la dimension politique de ces normes joue sur les performances économiques d'un pays. Dans ce contexte, nous nous demandons si l'idéologie politique influence directement la croissance ou indirectement à travers des canaux politiques représentés par les politiques votées par les individus. L'idéologie d'un pays pouvant être définie comme le choix d'une société concernant le niveau approprié d'intervention du gouvernement dans l'économie, nous étudions également si l'intervention du gouvernement peut jouer le rôle de mécanisme de transmission dans la relation idéologie-croissance. Deuxièmement, dans la mesure où les comportements électoraux reflètent l'idéologie politique des individus, nous étudions l'impact de la croissance économique sur l'idéologie des électeurs. Plus précisément, nous avons pour but d'étudier la manière dont la croissance économique affecte les comportements électoraux. Par conséquent, nous objectif est double. Nous souhaitons améliorer la compréhension du rôle joué par l'idéologie et plus généralement les croyances des individus dans le processus de croissance économique et ainsi contribuer à la littérature sur la croissance économique. Nous participons aussi à la recherche sur les déterminants des croyances des individus et de leur évolution. Pour cela, nous utilisons une nouvelle base de données couvrant l'ensemble de l'expérience démocratique française depuis 1870. Nous avons également construit des bases de données similaires pour les Etats-Unis et le Royaume-Uni mais cette thèse est principalement appliquée au cas français. L'étude de pays individuels en longue période requiert l'emploi d'analyses en série temporelle avec des données annuelles. Nos résultats nous permettent d'identifier un effet de l'idéologie politique sur la croissance économique tout au long de l'expérience démocratique française. Nous trouvons qu'un déplacement de l'idéologie des électeurs vers la droite du spectre politique a un effet de long terme positif sur la croissance économique. Nous trouvons également que cet effet de l'idéologie sur la croissance passe par la taille du gouvernement pour la période pré-première guerre mondiale

mais pas pour la période post-guerre. Cela suppose donc un effet direct de l'idéologie politique sur la croissance politique pour la période pré-guerre et un effet indirect pour la période post-guerre. Nous trouvons que cette différence s'expliquer par des relations non-stables entre idéologie et taille du gouvernement d'un côté et entre taille de l'Etat et croissance économique de l'autre. Nos résultats nous permettent également d'identifier que la croissance économique ne fait pas basculer l'idéologie des électeurs vers la droite ou la gauche. Néanmoins, nous trouvons que la croissance économique influence l'instabilité idéologique des électeurs qui changent leurs habitudes de vote.

Mots clés : Idéologie, Croissance Economique, Taille du gouvernement, hypothèse de non-linéarité, Baumol Cost Disease, Volatilité Electorale, Vote Economique, Série-temporelles, France.

CONTENTS

GENERAL INTRODUCTION

The endogenous growth theories have emphasized the central role played by governments in the process of economic growth. By implementing policies that promote knowledge (Romer, 1990; Grossman and Helpman, 1991), innovation (Aghion and Howitt, 1992) and public infrastructure (Barro, 1990), governments can work on growth on a long-run basis. Indeed, appropriate policies in terms of technology, education and health can foster investments in human capital and infrastructure. However, the processes of economic growth and of developing growth-enhancing policies are not straightforward and can be decomposed into several layers (Williamson, 2000). A first layer is composed of the direct motivations to invest and accumulate capital, such as capital investment subsidies and R&D subsidies. The second layer corresponds to institutional and structural reforms concerning for instance the allocation and protection of property rights, the regulation of markets and exchanges. Such institutional features indirectly affect growth through the incentives to innovate. In addition, there exists a third growth layer that is considered by Aghion and Howitt (2009) among others as the most important: culture and beliefs. This importance comes from the fact that changes in this layer determine the changes in the subsequent layers (Williamson, 2000).

In this literature, culture refers to individual and collective beliefs, social norms and different features of individual preferences (Aghion and Howitt, 2009). As opposed to the institutions of the second layer called “formal institutions”, the set of beliefs and norms that constitute the third layer is qualified as “informal institutions” (North, 1992). Contrary to the formal institutions that can be regulated by government and that evolve “quickly” (at the scale of decades), informal institutions are not implemented by state and evolve very slowly (at the scale of centuries), according to the environment (Williamson, 2000). Among the informal institutions, a significant part of the New Institutional Economics initiated by Douglas North attributes to ideology a central role in the process of economic development. In this perspective, ideologies are the shared mental models that individuals construct to make sense of the world around them (Denzau and North, 1994). Therefore, ideologies can influence the

evolution of political-economic systems and societies by shaping the interpersonal relationships. However, this literature is mainly theorical and suffers from an empirical lack.

The bourgeoning empirical literature exploring the growth effects of social norms has left aside the potential effect of individuals' political ideologies. Instead, this literature has mainly focused on ethnic heterogeneity (Easterly and Levine, 1997), accumulation of human capital (Tabellini, 2007), mutual trust (Knack and Keefer, 1997; Zak and Knack, 2001; Guiso et al., 2005). This literature has also investigated the transmission mechanisms between culture and economic growth. Aghion et al. (2011) emphasized the channel of labor market regulation through which trust affects economic growth. Doepke and Zilibotti (2008) put the light on the parents' rate of time preference for their children that determines the children's trade-off between current consumption and capital accumulation.

However, as far as we know, the paper by Bjornskov (2005) is the first one that explicitly focuses on the effect of individuals' political ideology on the long-run economic growth. Indeed, Bjornskov (2005) provides a theoretical framework supporting that people with a strong merit assumption (thinking that inequality is fair and expecting high returns to their effort) are more productive and thus directly foster economic performance. In addition, people with such an assumption votes for rightwing parties promising stronger legal systems and less government intervention in the economy. In this manner, they indirectly boost economic growth. Bjornskov (2005) uses panel data for the period 1970-2000 and provide evidence that countries to the right of the average do experience more growth, especially thanks to better legal systems and less government intervention. Besides, a very few papers tackle similar issues. Using panel data, Bjornskov (2008) provides evidence that the higher the income inequalities are, the more a government shift to a right-wing ideology improves growth. Osterloh (2012) provides evidence for the absence of growth effect of government's political ideology. However, he shows that some ideological dimensions associated with market intervention and welfare state policies impacts negatively on growth.

The relatively low interest in the literature on the growth effects of political ideology compared to the growing literature on other social norms is the main motivation of this dissertation. Therefore, the first purpose of this dissertation is to investigate the effects of individuals' political ideology on economic growth.

We focus in this dissertation on the French democratic experience since the establishment of the 3rd Republic in 1871, what presents several interests compared to the pervious literature. First, as the few empirical literature on the topic focuses on rather short periods, it is interesting to investigate the relationship over long periods of time. In this regard, the

French history provides a relevant case with a stable and democratic regime since 1871. Second, contrary to other old democracies such as in the U.S. or in the U.K., France has experienced a relative persistence in its right-left ideological divide that has consistently structured its political landscape. Indeed, as the right-left divide originates in France in the wake of the French Revolution, it is already firmly established in 1870 and has had a permanent hold on the French political life. Indeed, contrary to other democracies, the social issue appears since from the 19th century with socialist parties in the France political spectrum and has remained a touchstone in French politics (Goguel, 1946; Candar, 2005). By contrast, looking at the U.K. for example, New Labour is nowhere near as left as Labour was a few decades ago - and can even be considered more rightwing than the Tories of the 1930s (Cusack et al, 2010). In this context, the persistence of a clear ideological divide illustrated by some historians such as Siegfried (1930) makes France especially adapted to the study of the consequences of political ideology. Another interesting specificity of the French political ideology is its left position compared to the other countries. In fact, according to the World Public Opinion Survey (2005), France has the lowest ratio of citizens expressing confidence in the free-market system compared to the state, with 36%, even lower than Russia's 43% and considerably below China's striking 74%.

Moreover, the origin and persistence of political ideology are of great interest to understand the interactions between ideology and economic growth. The effects of the economic environment on citizens' political ideology are the other major question of this dissertation. The existing literature does not provide appropriate frameworks to study this relationship. To the extent that electoral behaviors reflect voters' ideology[1], the theory of economic voting provides an explanation of voting patterns but irrespective of the voters' ideology. In the wake of Kramer (1971), a large body of literature on economic voting has explored the impacts of macroeconomic changes on incumbent support in elections. According to the hypothesis on government responsibility for national economic conditions, voters punish or reward the incumbent on the basis of their economic performance. However, this theory does not provide explanations of the support for opposition parties. The electoral fortunes of non-governing parties are most often missing in models (Nannestad and Paldam, 1994). In brief, this theory only focuses on the voting pattern for the incumbent and not on the electoral behaviours in general. As a consequence, this theoretical framework is unable to

[1] Individuals' political ideology might reflect norms and preferences that influence their electoral and economic behavior. For example, large-scale experimental studies by Mitchell et al. (1993) and Scott et al. (2001) find that the political ideology of experimental subjects affects their behavior and mental models.

investigate the possible impacts of the economy on the votes for opposition parties. Besides, a marginal literature more systematically studies the consequences of the economy on voters' policy sentiments shift along a right-left axis. This literature argues that individuals' ideology shifts leftwards when the economy is prospering and to the right during recessions (see Durr, 1993; Stevenson, 2001; Markussen, 2008). Therefore, in addition to slow-moving sociological factors developed by the Michigan School (Lazarfeld et al., 1944), political ideology seems to be determined by some short-term economic factors. Consequently, we are also interested in the effects of economic growth on political ideology in this dissertation.

This Ph.D. dissertation seeks to study the direct and indirect interactions between voters' political ideology and economic growth throughout the French democratic experience. Assuming that electoral behavior reflects voters' political ideology, our first question is whether and how voters' ideology along a right-left axis can impact economic growth. We assume that citizens' political ideology can affect growth either directly or indirectly. The direct effect of political ideology on economic growth refers to the effects of citizens' ideology outside any policy channel, for example regarding their labor and saving behaviours. The indirect effect pertains to the growth effect of the policies determined by the voters' preferences. In other words, the indirect effects of voters' ideology are mediated by certain policies. As ideology can be regarded as a society's preference regarding the appropriate level of government intervention in the economy, we investigate the indirect role of government intervention as a transmission mechanism between voters' ideology and economic growth. In this regard, we want to understand the role of voters' ideology in the growing government intervention in the economy over the 20th century in France. Moreover, a thorough understanding of the transmission mechanism requires to investigate the impact of government intervention on the long run evolution of the economic output. As previously said, voters' political ideology can also be affected by the economic environment. Thus, the second question of this dissertation is whether and how voters' ideology can be influenced by economic growth.

The dissertation is composed of five essays. Essay 1 analyses the use of the concept of ideology in economics. It is the opportunity to emphasize the main thrust of this dissertation with regard to the literature. Essays 2 and 3 focus on the government intervention in the economy as a transmission channel from voters' ideology to economic growth. We decompose here the analysis of transmission mechanisms. On the one hand, in essay 2, we study the relationship between government interference in the economy and the long run economic growth. On the other hand, we investigate in essay 3 the role of political ideology in

the growing government intervention. Essays 4 and 5 propose to investigate more directly the interactions between political ideology and economic performance. This implies to assess the growth effect of voters' ideology but also to consider the possibility of reverse causality. That is the purpose of essay 4 while essay 5 focuses on the consequences of economic fluctuations on electoral behaviors. We now discuss in greater detail the organisation of this dissertation and the contribution of each essay.

Essay 1 studies the evolution of the concept of ideology in economics. This is fundamental for the investigation of the role of ideology in economy, which we undertake in this dissertation. The purpose of this part is to tackle decisive questions for our work, such as: what is ideology for economists and how do they define it? How can ideology be transformed into an analytical tool compatible with the economic behavioural model(s) and the economic method(s)? In which theoretical debates does the study of ideology take place. Such questions are fundamental in this dissertation since they allow to position the rest of the study in the existing literature and underlying debates. Since Meek (1967) and Samuels (1977), no study has taken stock of the treatment of ideology in economics. The recent literature underlying the importance for economists of studying ideology systematically reaches the conclusion that ideology is under-studied by economists (Denzau and North, 1994; Slembeck, 2004; Leroux, 2004; Higgs, 2008). Two common features of these studies are the focus on a very specific strand of the literature[2] and a qualitative methodology based on traditional literature surveys to explore the literature on the topic. We argue here that the pessimistic conclusions on the little interest of economists for ideology is due to the qualitative methodology used. Therefore, essay 1 investigates the issue by means of a quantitative analysis based on bibliometrics and a semi-quantitative content analysis. For that, we use a sample of 246 papers published in 45 top-ranked economics journals in the period 1920-2010 that appear to be representative of the whole economic literature. This kind of quantitative analysis is supposed to provide a more systematic and objective methodology than a traditional narrative literature survey (Stanley, 2001). In this manner, this essay provides evidence of the significant and increasing interest of economists for ideology, what contrasts with the conclusions of the previous literature. We also show that, by studying this concept, economics converged towards different approaches at different times, corresponding to specific theoretical debates. The modern approaches of ideology that we emphasize in our analysis

[2] Denzau and North (1994) explores the use of the concept of ideology in the New Institutional Economics, Hinich and Munger (1996) for the Public Choice literatrure, Slembeck (2004) for the evolutionist theory, Leroux (2004) for the history of economic thought.

supply us with methods to integrate ideology in the standard rational choice model. They also provide operating definitions of ideology in order to empirically study the economic effects of ideology. Moreover, the most recent approach of ideology that we identify in our sample stresses the importance of studying not only the consequences of ideology but also its causes. Understanding the shaping of ideology and more generally of beliefs appears as a central challenge for economists. In this regard, we try in this dissertation to take part in some essential and recent research related to the shaping of beliefs and preferences.

Essays 2 and 3 assess the indirect interactions between voters' ideology and economic growth. First, the complexity of this relationship comes from the fact that ideology may indirectly influence economic growth through policies voted by voters according to their ideology. Thus, these essays thoroughly study a transmission mechanism possibly mediating the effect of ideology on economic growth. In line with the existing literature, we focus here on the channel of government intervention in the economy. More precisely, we focus on the size of government, commonly defined in the literature by the share of total public spending in the output. Other policies as labor market regulation for example could admittedly be considered as appropriate transmission channels from voters' ideology to economic performance. However, the size of government is proved to be the main channel mediating the ideology-growth relationship in the literature (Bjornskov, 2005; Osterloh, 2010). Moreover, studying the French case in such a long period (1871-2008), we are constrained by the availability of data. Indeed, we have been able to construct a series of public spending for our observation period based on André and Delorme (1983). However, this has not been the case for other potential transmission mechanisms such as the quality of legal institutions, the labor market regulation, for which historical data is not available.

Second, the complexity of the relationship studied here comes from the fact that the growth effect of ideology can have evolved through time, especially over around 130 years. This can be explained by changes in the relationships, on the one hand, between ideology and government size, and on the other hand, between government size and economic growth. In this regard, essays 2 and 3 study of the transmission mechanisms by taking into account these possibilities and propose appropriate theoretical and empirical approaches. Among the previous studies on the effect of ideology on government size, only Pickering and Rockey (2011) provide a dynamic framework allowing the effect of voters' ideology to change according to the voters' income. As a complement of this theoretical framework, we provide here a dynamic analysis of the effect of ideology on government size. Concerning the relationship between government size and economic growth, most of the theoretical and

empirical literature studies this relationship within a linear model, not allowing a changing effect of public expenditure over time (for a comprehensive literature review, see Nijkamp and Poot, 2004). However, more recent studies argue for a nonlinear effect of government spending on economic performance (see Mueller, 2003 for a brief literature survey). Our study of the government size-growth relationship investigates this hypothesis, called the non-linearity hypothesis, for the French case over more than one century. Naturally, essays 2 and 3 study each one a step of the transmission mechanism between ideology and growth.

More precisely, essay 2 analyses the effect of public expenditure on economic output from both a theoretical and an empirical point of view. Our purpose is to examine here the validity of the non-linearity hypothesis with an original database on France. More precisely, we seek to address whether public expenditure can be growth-enhancing only to a certain share in the total output and if, beyond this share, the effect is negative in terms of economic performance. If this is true, then what is the growth-maximizing size of government? Our focus on the so-called "nonlinearity" hypothesis is driven by the deadlock reached by the numerous empirical studies estimating a linear relationship between government size and economic outcome. Indeed, the latest literature reviews on the topic agree on the fact that studies investigating a linear relationship have been inconclusive[3]. However, the literature on the nonlinearity hypothesis suffers from some theoretical and empirical inaccuracies. In this essay, we intend to cope with these lacks by first providing a framework in order to theoretically justify the nonlinear effect of government size on economic outcome. Our theoretical originality is to decompose the total effect of government size into the gross benefits stemming from the correction of market failures and the costs of government intervention entailed by state failures. In this manner, we consider that each euro spent by government has costs and benefits. We depart from the literature that justifies the non-linearity hypothesis by the distinction between productive and non-productive public expenditure (Barro, 1990; Lee, 1995; Devarjan et al., 1996; Chen, 2006). From an empirical point of view, we test the validity of the nonlinearity hypothesis with annual time-series on France for the period 1896-2008. As we construct new series that have not been already used in the previous literature, we provide a thorough analysis of the time properties of them with a battery of unit-root tests. We employ the two-step Engle-Granger (1987) co-integration method to estimate a nonmonotonic model in which real GDP is explained by government size and relevant

[3] See for instance Nijkamp and Poot (2004), Ciccone and Jarocinski (2010), Bergh and Henrekson (2011), Pitlik and Schratzenstaller (2011).

controls. As far as we know, no previous empirical studies have provided an empirical analysis taking into account both the nonlinearity hypothesis and the long-term, cointegrating relationship between government and output. This chapter provides evidence of a co-integration nonmonotonic relationship between government size and real GDP in France for our sample period. This suggests a changing relationship between both variables that needs to be taken into account in the rest of the dissertation. Moreover, the use of Granger causality tests supports the hypothesis of a one-way causality running from government size to economic growth. The estimated coefficients indicate that the output-maximizing government size in France is 30% of GDP. Compared with the few comparable studies on the U.S.[4] in which the growth-maximizing size is around 20%, our result shows a French originality with a quite high efficient government size.

Essay 3 analyses the determinants of government size and especially the role of voters' ideology along with traditional explanations. For comparison purpose, we conduct an empirical investigation for France as well as the U.S. and the U.K. that are democratic all over the 20th century. Indeed, democractic regimes are essential to investigate the demand-side explanations based on the voters' preferences for public expenditure. For that we construct a novel and comprehensive dataset starting in the late 19th century for the three countries. The purpose of this essay is to investigate the diversity of the determinants of the growth of government, according to the country and the period studied. While a huge literature already exists on the topic, only Florio and Colautti (2005) and Pickering and Rockey (2001) provide dynamic models showing that the effect of voters' income on the government size depends on the burden of taxation and on the voters' ideology, respectively. However, the explanation that received the strongest empirical support in the literature seems to be the Baumol's (1967) cost disease[5]. Baumol explains the increasing share of the public expenditure by the increasing costs of the public sector, mainly represented by wages. In this perspective, we propose in this chapter a theoretical model to renew the current tests of the Baumol's hypothesis, which potentially suffer from some biases developed in the essay. In the theoretical model, we show that the Baumol's theory implies that the size of government is increasing in the labor share and that this impact increases as ideology moves left and as income rises. Thus we provide a dynamic framework in which the public sector's cots, the voters' revenue and ideology can have together a dynamic effect on the size of government.

[4] See Grossman (1987), Peden (1991), Scully (1994), Vedder and Gallaway (1998).
[5] For exhaustive literature reviews, see Holsey and Borcherding (1997) and Borcherding et al. (2004).

In a previous work, Facchini, Melki and Pickering (2012b)[6] provided robust evidence for the predictions of this theory with OECD data for the post-1970 period. The main result of essay 3 is a tremendous diversity of the determinants of government size depending on the country and the period studied. Nevertheless, we find robust evidence for the theoretical predictions of our model, at least for France and the U.K. for the post-second war period. In addition, we show a significant positive effect of leftwing political ideology only for France for the post-second war period. Regarding the purpose of this dissertation, this result suggests that government size can be a transmission channel for France for the post-war period. This also suggests that this channel could not be appropriate for the U.S. and the U.K.. Our results also confirm the absence of effect of economic output on government size, discarding a potiential concern of endogeneity for the purpose of this dissertation.

Essays 4 and 5 focus more directly on the interactions between political ideology and economic growth. Contrary to essays 2 and 3 that studiy separately the transmission mechanisms from ideology to government size and from government size to economic output, essay 4 directly assesses the effect of ideology on economic growth. Essays 2 and 3 complement essay 4 in the sense that they provide important information concerning the time-series properties of the variables and the structural breaks in the relationships between the variables. Essays 4 and 5 also intend to study the causality between ideology and growth by studying the potential effects of the economic environment of electoral behaviors. Indeed, the literature studying the growth effects of political ideology[7], either in a political business cycle framework or in a long-term perspective, does not take the reverse causality bias seriously. However Markussen (2008) among others argues that economic booms can lead voters to vote for leftwing parties and economic crises can lead them to vote for the right. Consequently, essay 4 provides a thorough analysis of the possible endogeneity bias in the ideology-growth relationship. We allow here the economic growth to play a role in the votes for right- and leftwing parties. Besides, more originally, essay 5 studies the effects of the economic environment on the instability of the electorate's votes from one election to the other. Consideding that voters express their ideologies when voting, a generalized change in voting patterns can be considered as a momentum of ideological instability. This last insight completes our study of the growth-ideology relationship.

[6] Focusing on different area and time period, this paper is in not included in this dissertation.
[7] See Snowberg et al. (2007), Gerber and Huber (2009) and Potrafke (2012) for the latest studies.

More precisely, essay 4 empirically examines the impact of voters' political ideology on economic growth in the French democracy since 1871. By studying the long-term effect of voters' ideology, this essay departs from the rest of the literature that mainly investigates the effect of government's partisanship on the business cycle and not the trend of the output growth. This chapter also complements the literature on the growth effect of individuals' social norms, which mainly focuses on social capital and trust. Moreover, our time series-analysis covering 130 years departs from the existing literature studying the effects of political ideology. Indeed, the literature is mainly composed of cross-sectional studies that focus on a group of countries or regions (Potrafke, 2012). In this study, we first address the property and the reliability of a measure of political ideology over a long period of time. For that, we gathered different historical sources to construct an original ideology based on the composition of the Lower Chamber of the parliament, the sole political institution elected by the universal suffrage throughout our observation period. To identify the political affiliation of the different parties, we rely on the right-left divide of the period. This is an originality compared to the existing literature that uses time-varying indexes based on the content of the parties' manifesto provided by Beck et al. (2001) or Budge et al. (2001). Second, this essay investigates the robustness and the causality of the relationship between political ideology and growth. We use here various econometric methods such as Granger causality and 2SLS methods to control for the possible reverse causality. Third, we study here the role of government intervention as a transmission channel through which political ideology affects economic performance. The main conclusion is that, compared with left-wing parties in power, right-wing majorities in parliament have experienced higher economic growth rates. The long run impact of a switch from a totally leftwing parliament to a totally rightwing one is an increase in the GDP growth rate of 1.20%. We also provide evidence for the post-second-war period that the growth effect of ideology is mediated by the voters' preferences regarding the suitable size of government in the economy.

The last essay wonders whether economic growth influences the ideological instability approximated by the volatility of the votes received by each party from one election to the other. A large body of literature on economic voting has explored the impacts of macroeconomic changes on incumbent support in elections. However, this literature does not explore the issue of the effect of the economy on the votes for non-governing parties. This puzzle partially comes from the fact that these studies initially aim at explaining the American bi-party political system but is actually unable to predict the votes for non-governing parties in political landscapes such as the French one. This lack also owes to the limitations of the

theory of economic voting, which we attempt to remedy by suggesting a more comprehensive theoretical framework based on ideological voting. From an empirical point of view, it appears more relevant to study the aggregated electoral volatility, for which Pedersen (1979) proposed an index. In this essay, we use this index as a main dependant variable to investigate the effects of economic factors on the instability of the votes not only for the incumbent but also for opposition parties. As a comparison, we investigate the determinants of the votes share for the incumbent, to know to what extent the determinants of the votes for the opposition parties and those for the incumbent differ. Using time-series data on 46 democratic elections held in France from 1889 to 2011, we provide evidence that the total electoral volatility has been determined by specific economic determinants that differ from the ones influencing the vote share of the incumbent. Focusing on the economic determinants, the volatility of the votes for opposition parties and the electoral volatility in general are influenced by the economic growth but not by inflation and unemployment. On the contrary, we document that the votes for the incumbent is only determined by unemployment among the economic factors. While this last finding is consistent with the literature on the voters' punishment of the incumbent, the former concerning the economic determinants of the vote share for non-governing parties is more original given the existing literature.

A general conclusion takes stock of our main findings and discusses some limits and possible extensions for future research.

1. IDEOLOGY IN ECONOMICS[1]

"*Whether because of its parsimony, its long-established position in popular and academic discourse, or because of some set of associated traits which are deemed useful – and not sufficiently conveyed by neighbouring concepts – ideology remains a fixture in the work of political scientists, social psychologists, political anthropologists, sociologists, and historians*" (Gerring, 1997, pp. 961-62).

1.1 INTRODUCTION

In one of the most accomplished studies on the treatment of the concept of ideology in social sciences, Gerring (1997, pp. 961-62) remarked that ideology is "a fixture in the work of political scientists, social psychologists, political anthropologists, sociologists, and historians". Far from disagreeing with him, this present paper merely upholds that he quite wrongly forgot to mention economists among this list of social scientists. It must, however, be acknowledged that if the concept of ideology has today a rather clear status in the other social sciences, the same cannot be said of the economic discipline. Indeed, since Meek (1967) and Samuels (1977), no study has taken stock of the treatment of ideology in economics, maybe aside from Hinich and Munger (1996), who focused on the specific use of the concept in the public choice analysis. This void in the economic literature strongly contrasts with recent seminal studies coming from other disciplines like political science (Knight, 2006), sociology (Lynch, 1994) and social sciences in general (Gerring, 1997). Furthermore, although some economists such as Denzau and North (1994) and Higgs (2008) assert that accounting for ideology is fundamental for economists, they most often regret that their call has not been

[1] This essay is based on Melki (2012).

heard by their peers, who are suspicious of the whole concept of ideology (Slembeck, 2004; Leroux, 2004).

This attitude of economists towards ideology has different and sometimes opposite reasons. Indeed, after having invented the word "ideology" in the wake of the French Revolution, the French philosopher Destutt de Tracy (*Mémoire sur la faculté de penser*, 1796) and his followers were contemptuously labelled by Napoleon as "ideologues" for their "unrealistic" political stances. Since then, the pejorative connotation of the word has been deeply rooted in the popular and sometimes academic discourses. Then the word was really introduced around half a century later in social science by Karl Marx, who published with Engels in 1845 in *The German Ideology*, a work that laid the foundations of what would become the Marxist approach to ideology and which Marx specified in *The Poverty of Philosophy* in 1847. But the underlying holist and materialist approach that has long prevailed in social science would not fit the individualistic and rational assumptions of the *homo œconomicus* model of standard economics. Moreover, the strong Marxist connotation of the term "ideology" led major authors to use alternative words in whole social science (Gerring, 1997, p. 962) and especially in economics. For instance, Pareto (1917) spoke about "derivation" and Mises (1949) about "world view".

Another reason for economists to be suspicious towards the concept was supplied by the sociology of knowledge and especially its founder, Karl Mannheim, who insisted on the reflexivity of the term. According to the paradox of Mannheim (1936), it is not possible to have a scientific discourse on ideology that would not be itself ideological. Furthermore, the complexity of the notion of ideology that Gerring (1997, pp. 961-62) presented as a source of interest in other disciplines could be perceived as an obstacle in economics. Indeed, the difficulty in building a formal or empirical analytical tool from a fluctuating and polysemous notion antagonized the ambition of economics to be a hard science. Finally, it is often said, on the contrary, that Schumpeter (1949), one of the first major economists to have been interested in ideology, would have reduced the term to a mere "value judgment" (Katouzian 1980; Leroux, 2004), thus depriving the economic debates on ideology of all the depth of the concept. But all these reasons, whether good or bad, should not minimize the diversity of the economists' studies that the topic has given birth to. That led us to think that it is not the concept of ideology that has been minimized by economists but rather the economic studies on ideology. However, a closer look into these studies is very instructive about the evolution of economic science.

The fact that economists seem to be unaware of the richness of the study of ideology in their own discipline is probably due to the absence of an appropriate analysis of the various and scattered economic studies. The present article shows that there exists a flourishing literature dealing with ideology in various fields of economics but no connection has been established until now. That is probably due to the strong diversity of these studies, maybe too far from each other to be mutually aware. As all the scarce analyses of the economic treatment of ideology were in the form of literature survey, that led us to think that the pessimistic conclusions on the little interest of economists were maybe due to the methodology used. Therefore we decided to investigate the issue by means of a quantitative analysis based on bibliometrics and content analysis of 246 articles published in 45 top-ranked economics journals in the period 1920-2010 that appear to be representative of the whole economic literature. This kind of quantitative analysis provides a more systematic and objective methodology than a traditional narrative literature survey (Stanley, 2001).

The bibliometric analysis reveals that economists have indeed studied the concept of ideology. Since the publication of the first articles on ideology in the 1920s in the economic journals, the concept has appeared as an important topic in a growing number of articles published in a growing number of top-ranked journals. It also appears that political economy, epitomized by the journal *Public Choice* in our sample, has significantly contributed to the study of the concept, at least during the last decades of our study.

A further analysis of the content of our sample of articles reveals a high degree of convergence among economists towards four main approaches to ideology at different times. First, from the 1930s to the 1970s, by opposing ideology with science, economists massively took part in a traditional epistemological debate opened by sociology and philosophy on the ability of researchers to produce scientific knowledge not affected by ideological biases. This approach enabled them to investigate the scientificity of their own discipline. Second, from the 1960s and at its peak in the 1980s, political economy, partly driven by the review *Public Choice*, adopted an original approach to ideology to integrate it into the model of rational choice, thus epitomizing the extension of the theory of rational choice. Third, for the last two decades, the economic literature has predominantly followed the traditional approach to ideology in political science in focusing on the political dimension of the concept, making ideology a common empirical tool. Fourth, in a looming research agenda, economics has started, through a cognitive approach to ideology, to study the formation of individuals' beliefs and preferences to account for the formation and persistence of institutional equilibrium and the process of change.

The article is structured as follows. The second section presents the bibliometric methodology. Then the third section explores to what extent economists have studied the concept of ideology. The fourth section proposes identifying and categorizing the main economists' approaches to ideology and the underlying theoretical debates. The fifth section concludes.

1.2 BIBLIOMETRIC METHODOLOGY

In order to claim to be more exhaustive and objective than a typical literature survey, we chose to adopt a quantitative-type methodology based on the study of a representative sample of the literature. However, we cannot resort to a standard meta-analysis used in economics to assess an existing body of findings in a sample of empirical studies. The nature of information is different in our case because it is not purely quantitative. Indeed, we do not look for a quantifiable relationship between economic variables but we rather have to identify some articles and examine and categorize their literary content, which is qualitative information. For this purpose, bibliometrics is the commonly used methodology. It is very often used, on the one hand, through citation analysis, for instance to build the journals' impact factors, and, on the other hand, through content analysis. While the bibliometric method is widespread in information sciences and experimental behavioural sciences, it has started to be used in economics. It has been most often used through citation analysis to study, for example, the impact of economics on other disciplines (Landes and Posner, 1993) or of a specific economic field on the whole discipline (Rubin and Chang, 2003) or the influence or, more surprisingly, the absence of influence of some authors (Cox and Chung, 1991; Rowley, 2009). But, in this study, we resort to content analysis, i.e. a set of techniques "for making inferences by objectively and systematically identifying specified characteristics of [texts]" (Neuendorf, 2002, p. 10).

But this method is, of course, not flawless. It raises other difficulties than a traditional literature survey and also requires methodological choices. Indeed, this kind of quantitative study is possible thanks to the evolution of the data processing that enables us to have easy access to numerous scientific studies on various electronic databases. But the abundance of unequal information also raises the limits of a bibliometric method. Therefore the first difficulty is inherent in the selection of the set of studies among which we will perform our content analysis to build our sample of studies dealing with ideology. Should we search in

books, in scientific journals? Which ones exactly? In which period? How should we define a limited set of studies in which we will apply the content analysis? The most important thing is to have a uniform, continuous database, even if this means losing completeness. That would limit biases. The second difficulty lies in the building of the sample of studies dealing with *ideology*. How should we define and identify the studies dealing with *ideology*? The underlying trade-off is between *coverage* and *precision*, both of which tend to vary inversely (White, 1994). We must here reconcile the will to be exhaustive and the difficulty in accurately analysing the content of studies selected. A related concern also comes from the fact that, with insufficiently strict selection criteria, our sample to analyse would be composed of studies that would deal with *ideology* only in a trivial or anecdotal way. Thirdly, the last but not least difficulty is to choose an appropriate technique for the text analysis among all the available ones, in order to differentiate and classify the various approaches to *ideology*.

Basically our bibliometric methodology is quite close to the one used by Knight (2006). Indeed, our first methodological choice is to focus on journals rather than books because only the former are quite uniformly available on electronic databases and so they have become the principal current research medium (Kuhn, 1970). However, among all the existing journals in economics, only a few are available on electronic databases. Thus the issue of the choice of journals is decisive. Led by the trade-off between the coverage of the whole literature and the precision provided by a limited sample of studies, we chose to focus the analysis on the best-ranked journals, which are supposed to be the most visible and widely read by economists. Thus we selected 45 out of the 56 top-ranked economic journals according to the *European Reference Index for Humanities* in 2009[2]. We sidelined 11 journals[3] not available on JSTOR or ECONLIT databases. The journals of our sample are presented in the appendix (Table 1.1 – Appendix).

We are aware that such a choice is likely to introduce a bias in our analysis. Indeed, this sample of journals inevitably glosses over a number of studies. For instance, the non-ranked

[2] The French Evaluation Agency for Research and Higher Education proposes a ranking of journals in economics, based on the *European Reference Index for Humanities*.

[3] The journals that we do not take into account in our study are: *World Development*, *Journal of Economic Growth*, *Journal of Economics and Management Strategy*, *International Journal of Industrial Organization*, *International Journal of Production Economics*, *Entrepreneurship: Theory and Practice*, *Economics and Philosophy*, *European Economic Review*, *Games and Economic Behavior*, *Health Economics*, and *Ecological Economics*. We take the journal *History of Political Economy* into account only in the first part of our study but not for the content analysis because the full text is not available on the electronic databases used.

journals appear to be among the most prolific on the ideology topic.[4] This choice also leads us to do without innovative and influent articles from new journals.[5] And a potential bias could stem from the fact that the top-ranked journals mainly published the studies of orthodox economists who are said to minimize the ideology topic as compared to the heterodox ones (Samuels, 1977, p. 472). Therefore, to make sure of the representativeness of our sample of journals, we will, on the one hand, compare some of our main findings with the results obtained for all of the economic journals available on JSTOR and, on the other hand, we will refer as much as possible to seminal articles from other journals that contributed to the study of ideology in economics and that are quoted in the articles in our sample. In spite of these flaws, our sample has the advantage of offering a good trade-off between coverage and precision and of being time-consistent, because all the 45 top-ranked journals are quite old and therefore allow comparison over time.

To cope with the second difficulty pertaining to the identification of the articles dealing with *ideology*, we chose to pick the articles containing the words "ideology", "ideologies" or "ideological" in their title or in their abstract or keywords. Such a choice would probably lead us to underestimate the number of papers on *ideology* but it prevents us from having articles that make trivial use of the term and that would not be workable in the rest of our study. As a comparison, in her study, Knight (2006) chose far less restrictive criteria by picking from the whole text extra words such as "ideologue" and "ideologues", but also words that designate a particular ideology, such as "communism", "fascism" and other closely connected words.

Lastly, to tackle the issue of the different approaches to ideology in our sample, we chose to classify our articles according to two criteria. First, which definition of ideology do they supply, and second, which research question do they tackle, in other words, which literature do they belong to? So as to answer both questions, we need articles that deal with *ideology* in a substantial way. Therefore, at this stage of the analysis, we discard all the articles that refer to ideology in an anecdotal way, which we define as having less than two occurrences of *ideology* in the main text. In the remaining articles, we look for the definition of *ideology* thanks to an electronic research of the word *ideology* in the main text. In numerous articles, an explicit definition is supplied. When this is not the case, we pick the recurring words that are

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[4] Indeed, *The American Journal of Economics and Sociology* is one of the first journals to deal with *ideology* as early as the 1920s. *Economic and Political Weekly* is the most prolific journal with 84 articles with "ideology", "ideologies" and "ideological" in their title, abstract or keywords between 1966 and 2004.

[5] For instance the *Journal of Economic Issues*, the *European Journal of Political Economics*, the *Review of African Political Economy* or the *Review of International Political Economy* published a significant number of interesting articles on ideology.

most often associated with *ideology*. By gathering these words, some lexical convergences appear. Based on them, we establish the main categories of definitions. Finally, with regard to the research question of each article, this is often most easily identifiable by reading the abstract. Another indication is the citation analysis, since authors quote the pioneers of the debate in which they participate. That also enables us to identify the authors who launched new research programmes. In this way, it is possible to establish a classification of the approaches and definitions of ideology and to study the evolution of these categories and the underlying debates over the concept of ideology in economics.

1.3 HAS "IDEOLOGY" BEEN STUDIED IN ECONOMICS?

This section quantitatively examines the widespread assumption according to which economists are not much interested in the concept of *ideology*. More precisely, we propose identifying the papers on ideology in economic journals and studying the evolution of their number.

Before focusing on our sample articles, it is worth pointing out that the word "ideology" appeared in economic journals more than one century after having been invented. Indeed, in the 1920s, *The American Economic Review (AER)*, *The Quarterly Journal of Economics (QJE)* and the *Journal of Political Economics* published about 20 articles that contained the word in their main text. That can seem late compared to political science (Knight, 2006, p. 620) and, more generally, compared to the whole of social sciences. Indeed, as early as the 1830s, some journals in other disciplines[6] published articles that referred to the "ideology" topic in their main text (see Figure 1.1). Figure 1.1 presents the evolution of the number of articles referring to ideology and connected words in their main text published in all the journals available on JSTOR. It appears that the word started to spread in social science as early as the second half of the 19th century. Following Knight (2006), in Figure 1.1 and in the following figures, the results are presented by decades to smooth out annual fluctuations and to control for changes in format and the number of articles published during a given period.

[6] Indeed the word first appeared in a journal of philosophy in 1830. Then it appeared in the 1860s in anthropology and ethnology, in the 1870s in philology, in the 1890s in sociology and history and in the 1900s in political science.

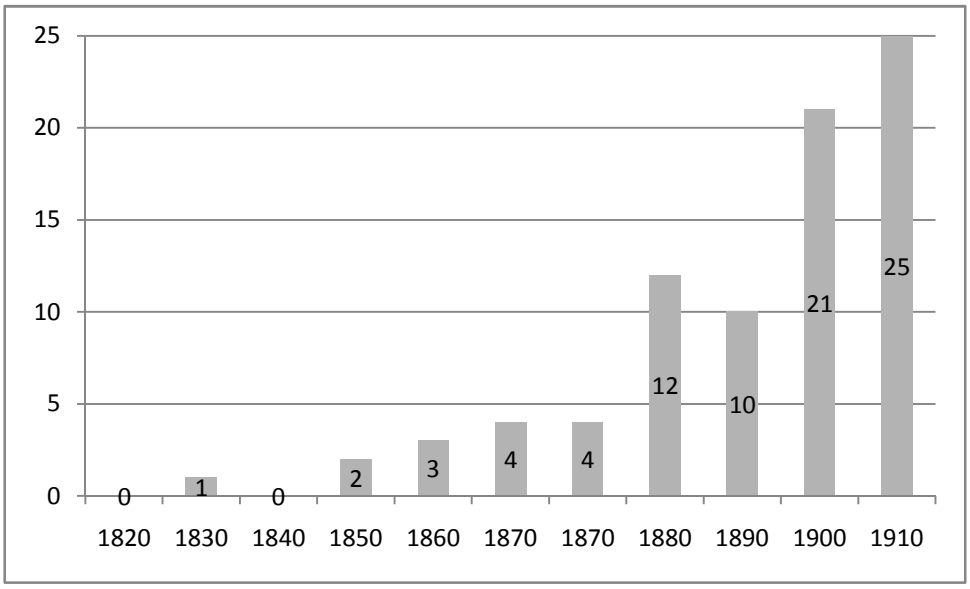

Fig. 1.1
Evolution of the total number of articles in social science that refer to ideology[7]

If we now focus on the 45 journals of our sample, 30 have published at least one article on the topic of ideology. In these 30 journals, we identified 246 articles dealing with ideology according to our criteria defined in Section 2. Figure 1.2 presents the evolution of the journals of our sample that published articles dealing with ideology, and Figure 1.3 presents the evolution of the number of these articles. It appears from both figures that the first articles focusing on ideology appeared in the 1930s and 1940s in the same journal, the *AER*, including, in particular, the seminal article of Schumpeter, "Science and Ideology", in 1949. During the 1950s, two other journals, the *QJE* and *Economic Development and Cultural Change*, addressed the topic with four articles on it. During the following ten years, the topic of ideology still stayed relatively marginal with six articles and the participation of *The Journal of Economic History* in the study of ideology. From the 1970s, we can consider that the issue began to spread in the literature because nine new journals published articles on ideology. We can assume that until then, although the study of ideology by economists progressively got under way in journals, this research took place at least as much in books. This is, for instance, obvious in Meek (1967) and Samuels (1977). The former studied the concept of ideology in the history of economic thought.[8] The latter listed more than 30 books

[7] Articles available on JSTOR without discipline filter, which refer to the words "ideology", "ideologies" or "ideological" in their main text.
[8] Especially in the books *History of Economic Analysis*, 1954 by Schumpeter, *Economic Philosophy*, 1964 by Johan Robinson and *Political Economy*, 1963 by Oskar Lange.

tackling the "ideology" issue in economics, published between 1951 and 1975 (Samuels, 1977, p.481-484). As, for a long time, the research had been more through books than articles (Kuhn, 1970), we probably underestimate the number of studies during the beginning of our period.

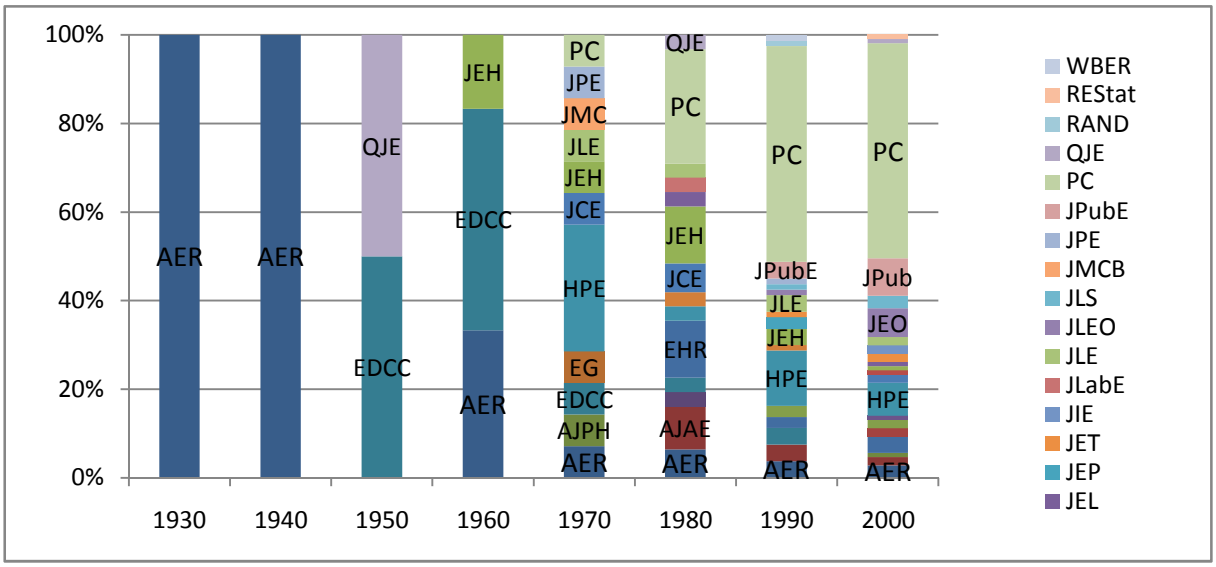

Fig. 1.2

Evolution of the journals that published articles on ideology[9]

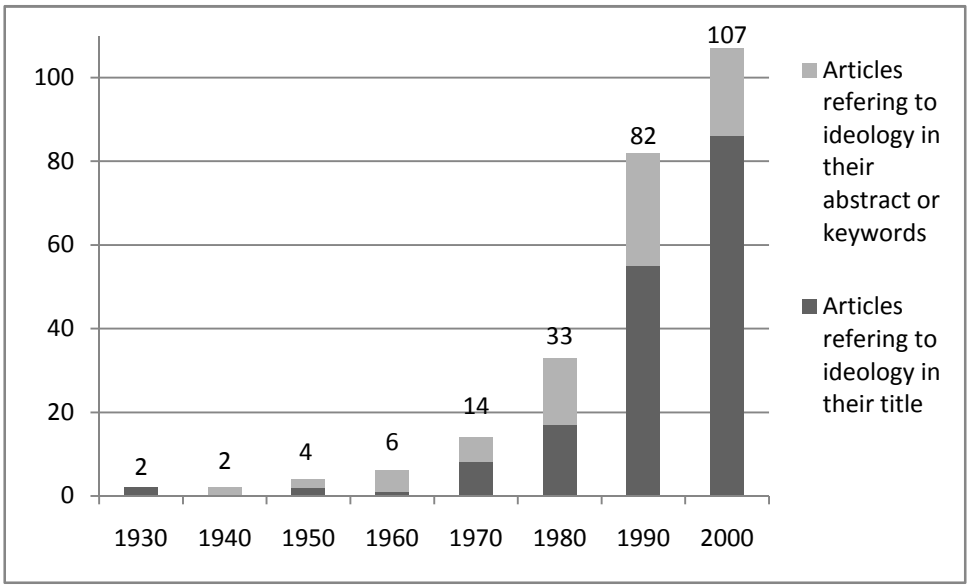

Fig. 1.3

Evolution of the number of articles with ideology as a topic[10]

[9] The journals in our sample that published articles that refer to the words "ideology", "ideologies" or "ideological" in their title, abstract or keywords.

At any rate, the 1980s appeared to be a turning point during which ideology became an important topic, with more than 30 articles focusing on ideology and stemming from about 30 different journals. The trend is confirmed in the following decade with 82 articles. This sharp increase can partly be explained by the growing interest of the journals of political economy epitomized by *Public Choice*, which published half of the articles of our sample in the 1990s. The number of articles kept on increasing during the 2000s to reach at least 100. As the electronic databases generally do not supply the latest journals' issues, we cannot precisely estimate the actual number of articles. One could assume that the growing increase in the attention of economists to ideology can be attributed to the increasing number of journals in our sample. However, that turns out to be false, as Figures 1.4 and 1.5 show. Figure 1.4 shows an increase in the number of articles weighted by the number of journals publishing these articles. Figure 1.5 also shows an increase in the number of articles weighted by the total number of journals in our sample. Indeed, most of the new journals that entered the AERES ranking are specialized ones and have not mentioned "ideology". So the decreasing share of the general journals in our sample could be expected to reduce the share of the papers on ideology in all papers. But this tendency is compensated for by the inclusion in our sample of field journals, especially in political economy, which focused a part of their attention on the study of ideology.

[10] Articles that refer to the words "ideology", "ideologies" or "ideological" in their title, abstract or keywords.

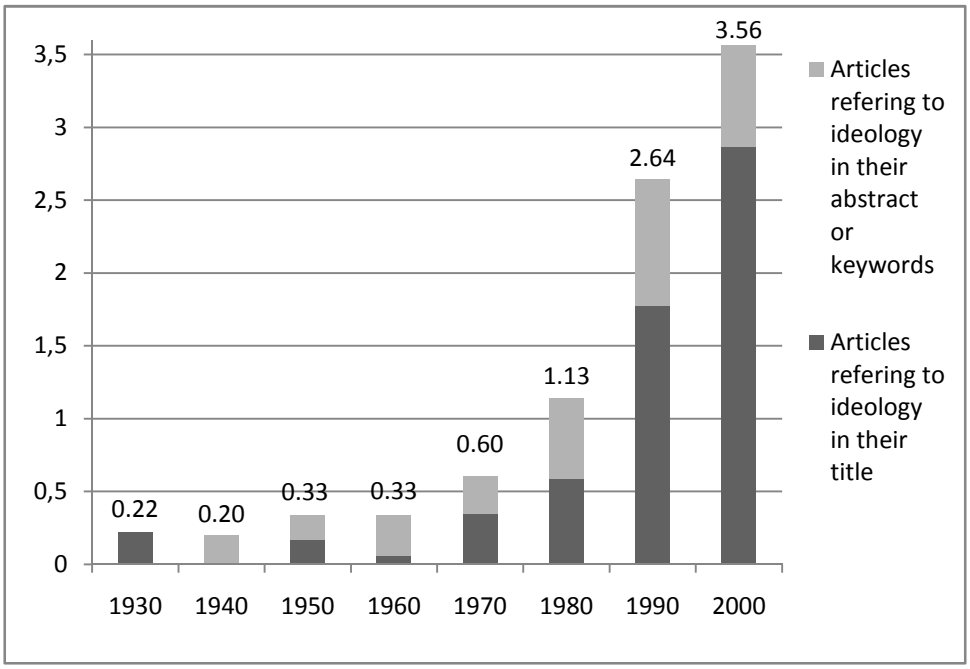

Fig. 1.4
Evolution of the relative part of the articles with ideology as a topic in the journals publishing articles on ideology[11]

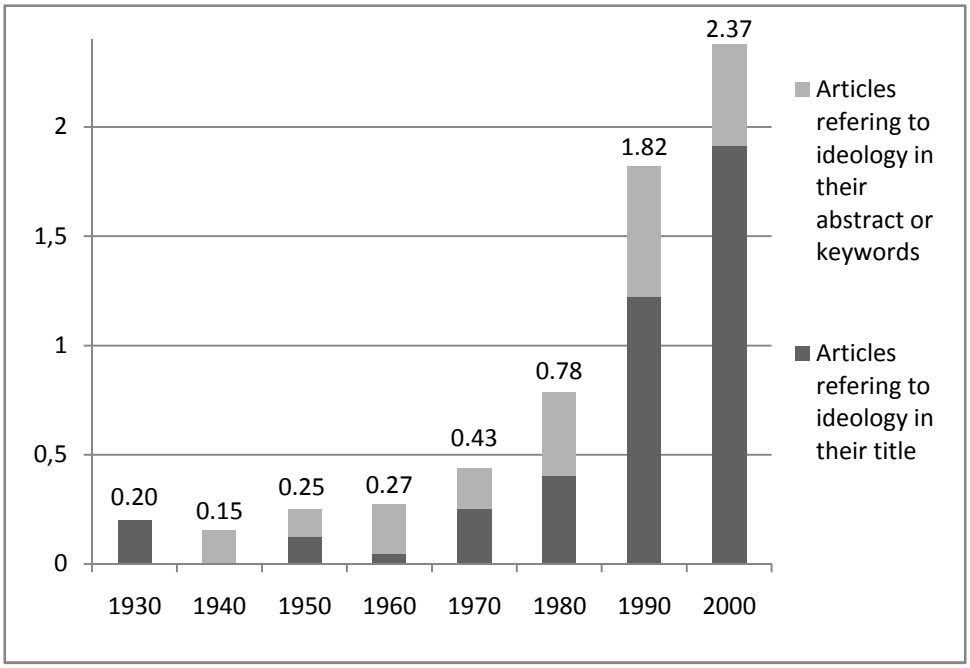

Fig. 1.5
Evolution of the relative part of the articles with ideology as an important topic in all the journals of our sample[12]

[11] Number of articles in Figure 1.3 divided by the total number of journals publishing these articles available for each decade.
[12] Number of articles in Figure 1.3 divided by the number of journals in our sample available for each decade.

One could also object to the assertion according to which ideology has become an important topic in economics given that there have only been 100 articles in the top-ranked journals during the last decade. But one must keep in mind that we voluntarily adopted very restrictive criteria for identifying articles for our sample in order to study them more deeply in a second stage. Thus our methodology greatly underestimates the number of economic studies on ideology. For instance, with the criteria adopted by Knight (2006),[13] we would have found around 20,000 articles in total with more than 4,500 articles in the 1990s (see Figure 1.6). And as Knight (2006, p. 620) did for political science, we could then notice an increase in attention among economists to ideology in the late 1940s-1950s. It is also interesting to notice that, with such criteria, since the 1920s, the total number of articles on ideology in economics has always represented approximately 10% of the total number of articles on ideology in all disciplines available on JSTOR. Indeed, Figure 1.7 shows the numbers of articles that refer to *ideology* in both economic journals and all the journals available on JSTOR. We can deduce from this that economists have shown an interest, like other social scientists.

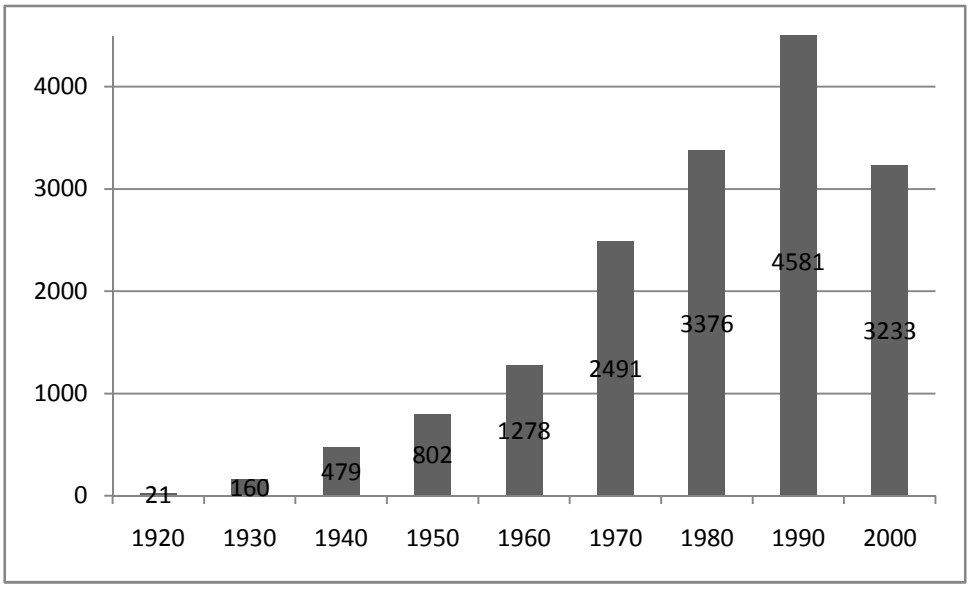

Fig. 1.6
Evolution of the number of articles referring to ideology in economic journals[14]

[13] We performed the research in all the economic journals indexed by JSTOR mentioning ideology and its cognates in the whole text over the same period.
[14] Number of articles that refer to the words “ideology”, “ideologies” or “ideological” in their main text in the economic journals available on JSTOR.

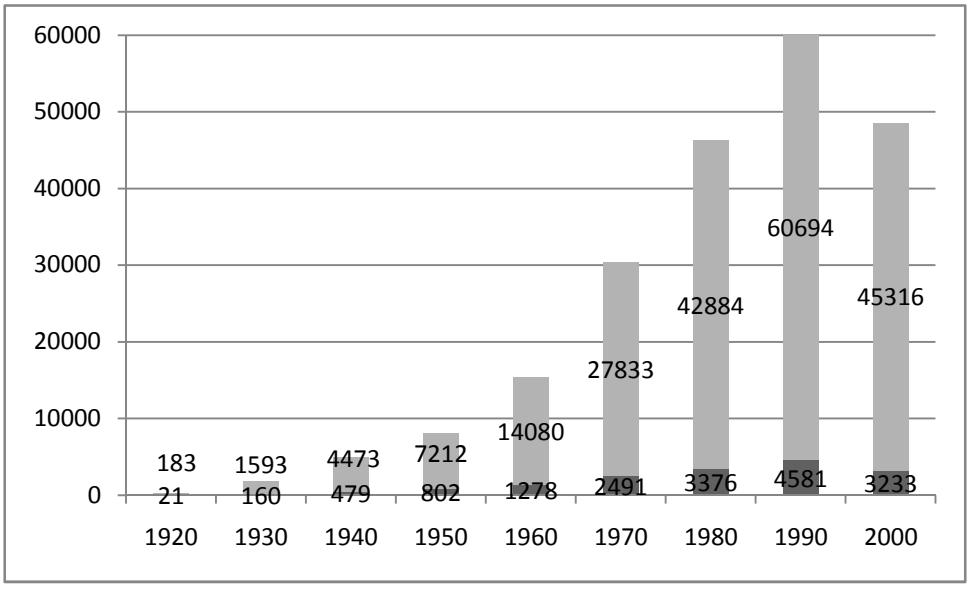

Fig. 1.7

Evolution of the number of articles referring to ideology in economic journals and in all social science journals[15]

This first stage of our bibliometric analysis allows us to conclude that ideology has been a significant and growing concern for economists, in the top-ranked journals as well as in the whole literature. It has been the object of more and more articles in a growing number of journals. While these papers were concentrated in a small number of journals until the 1960s, the topic spread, during the following decade, in a significant number of journals. And most of the journals in our sample have already published at least one article focusing on ideology. Even if we notice an increase in the attention to *ideology* as early as the 1950s, the "boom" of the number of articles occurred in the 1980s and we listed more than 100 articles with ideology as an important topic during the early 2000s. If we adopt less restrictive criteria, we realize that the studies in economics about *ideology* are not marginal compared to the whole economic literature and to all the studies on ideology in other disciplines.

[15] Number of articles that refer to the words "ideology", "ideologies" or "ideological" in their main text in the economic journals and in all the journals available on JSTOR.

1.4 THE MAIN ECONOMIC APPROACHES TO IDEOLOGY

Once we established that *ideology* has attracted economists' attention, the most interesting point is to know what they have said about it and for what purpose they have resorted to it. Thus this section proposes examining the evolution of the approaches to ideology in the articles of our sample. To paraphrase Matossian (1958, p. 228), to understand an approach to ideology, it is important to determine what problems its initiators are trying to solve. That is why, in each article, we look for the definition supplied of ideology and the question treated by the author. Out of the 246 articles in our sample, 171 supply explicit or implicit definitions, which could be categorized by inference according to the technique described in Section 2. Among the other 75 articles that refer to the term only in an anecdotal way, 60 do not refer to the main research questions identified in the rest of the sample and are thus not workable. They most often focus on the study of a specific ideology such as gender or racist ideologies. Once we have identified the definitions through the method detailed in Section 2, four main groups of approaches emerge that turn out to refer to four main stages of economics.

Before presenting these approaches, we can notice a first originality of the economic approach(es). The economic literature does not seem to have resorted to the original definition provided by Marx, contrary to other social sciences. Among the three main features of the Marxist approach that are the social origin of our ideas supposed to come from our material conditions (*materialism*) – (1) the function of ideology to serve the private interests of the ruling class (2) and the idea of a fallacy inherent to ideology that distinguishes it from science (3) – only the last one was taken up by the authors of our sample. Indeed, out of the 246 sample articles, only two (Bendix, 1957; Foley, 1975) consider ideology in accordance with the first two core concepts of the Marxist approach. In fact, the individualistic approach to the rational choice model that has dominated the neoclassical tradition in economics is obviously not compatible with the holist approach to the Marxist definition. On the other hand, a significant part of economic research has progressively questioned the assumption of self-interest in the rational choice model, thus leaving room for behaviours not led by the strict private interests and therefore opposing the second core element of the Marxist approach. That is rather the third element, the fallacy inherent to ideology, which gave birth to a plethoric literature in economics.

1.4.1 THE FIRST APPROACH: IDEOLOGY VERSUS SCIENCE

By proceeding to the content analysis of the sample articles, we identified a first set of definitions of ideology based on words belonging to the lexical field of science (such as *theory*, *knowledge*, *scientific*, *research*, *researcher*, *reason*, *finding*, *doctrine*, *assumption*, *economists* and *sociologists*), systematically associated with the idea of mistake (with words such as *erroneous*, *irrelevance*, *preconception*, *bias*, *prejudices*, *distortion*, *enslave*, *lie*, *perversion*, *unquestioned* and *anomalies*.). In short, they bring ideology into conflict with objectivity and assimilate it with a bias in the scientific knowledge. They appeared in our sample with the oldest article, by Homan (1932), who speaks about "a negation of systematic theory by reason of its erroneous ideology and of its irrelevance to problems of control" (Homan, 1932, p. 12). They are present with some variations in all the sample articles coming from the *QJE* and the *AER* during the first two decades, especially in Gruchy (1939), Schumpeter (1949) and Streeten (1954). The evolution of this category of definitions is presented in Figure 1.8, which shows the evolution of the various groups of definitions of our sample. It appears that the majority of our sample articles used this kind of definition during the first decades of our study until the late 1950s and then this approach progressively disappeared from the literature. This decrease can be explained not only by the emergence of new journals that supplied other definitions but also because the traditional journals that initially proposed this early definition changed their approach. That is obvious in the *AER*, which played a pioneering role in the *versus science* approach in the first decade of our study and which then supplied other types of definitions from the 1970s. In any case, there turned out to be a high degree of definitional convergence until the 1950s towards the *versus science* approach.

This approach to ideology corresponded to a specific theoretical debate in economics that came from the traditional epistemic issue of the production process of scientific knowledge. As Mannheim (1936, p. 18) put it, "the concern with the problems and pitfalls involved in the search for valid knowledge has constituted more than a negligible part of the studies of a long line of brilliant thinkers through Hume (*Enquiries concerning the human understanding and concerning the principle of morals*, 1927), Bentham, Mill (*A System of Logic, Ratiocinative and Inductive*, 1850) and Spencer". Taken up by Marx in 1845 in *The German Ideology*, who considered the classical economics as an ideology that justified the interests of the ruling class, the question, which spread into social science, became: how do you make science in spite of the searcher's subjectivity? The question gave birth to major contributions like the

theory of *derivations* of Pareto (1917), who considered socialism as ideological in 1902-1903 in *Socialist Systems*, the study of the role of "value judgment" in science of Schumpeter (1949), or the more neglected study of "world view" of Mises (1949), who denounced the ideological biases of Marxism. All these studies tried to locate the ideological biases in the adverse theory. From this critical and polemical use of ideology, the concept clearly appeared as a demarcation criterion that sharply separated knowledge and error.

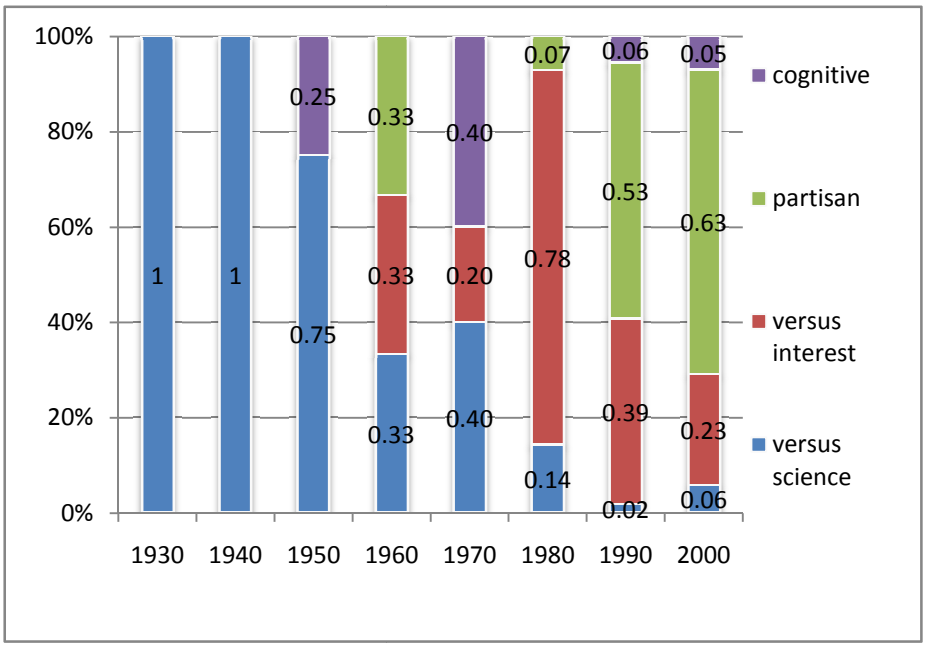

Fig. 1.8
Evolution of the different categories of definitions

This undertaking is echoed in our sample through two main debates. The first one focused on the location of the non-scientific biases in economic discipline, while the second one investigated the possibility of finding a valid scientific procedure that would not be distorted by ideologies. With regard to the first debate, the question in our sample was to know which field of economics or which concept is scientific or not. The Marxian theory, but also the use of mathematics in economics and the theory of value, drew a significant part of the attention of our sample articles. For instance, Homan (1932) examined the institutional economics, Gerschenkron (1969) the laissez-faire ideology, Hirschman (1982) capitalism, Smolinski (1973) Marxism, Caldwell (2000) socialism, and Streeten (1954) economic concepts such as utilities and social income. According to the other debate, at one extreme, some authors like Macfie (1963), in the vein of Pareto (1917) and Schumpeter (1949), considered that ideology

staves off any attempt at scientific knowledge; at the other, ideology would be necessary for scientists by "proposing a certain selection of problem for study" (Smolinski, 1973, p. 1192) or by providing economists with "preexisting thought structures or frames of reference" which "guide [their] selection, analysis, and interpretation of economic facts" (Gruchy, 1939, p. 62).

In most of the cases, the point was to reflect on the scientificity of the economic discipline and especially of the adverse theory, thus making *ideology* a polemical or critical concept. In spite of the attempt of some authors to alleviate its polemical quality and even to make it useful and part and parcel of the scientific process, generally speaking, economists reached a deadlock. They did not manage to move away from the traditional negative connotation of the concept. Incidentally, they came up against the Mannheim paradox related to the reflexivity of the term. Realizing thus the danger of a negative definition, as opposed to the truth, some of the above-mentioned authors of our sample refused to emphasize the opposition with science. For instance, Randall (1985, p. 1024) asserted that "the sharp separation of ideology from knowledge is not thought possible or especially desirable". The progressive disappearance of this approach from the 1950s in our sample and in the whole literature undoubtedly corresponded to this awareness and probably to the fact that economics progressively stopped looking into its own scientificity and started to take it for granted.

1.4.2 THE SECOND PERSPECTIVE: IDEOLOGY VERSUS INTEREST

The second significant generation of definitions that appeared in literature brought ideology into conflict no longer with science but with the notion of self-interest or more generally of rationality in the sense of the rational choice theory. It therefore reverses the relationship between the ideology and interest of the Marxist definition, in which ideology served private material interests. This approach does not often provide explicit definitions of ideology but can, however, be identified in our sample by the words systematically associated with the term "ideology" (such as *self-interest*, *benefits*, *profits or opportunistic behaviour*, *venality* and *career goals*). The basic idea of these kind of definition, well conveyed by Levitt (1996, p. 428), is that an ideological behaviour entails a loss of a private profit. However, a few authors supply a more accurate definition, such as Kalt and Zupan (1984, p. 281), who analyse the traditional opposition between ideology and interest in economics and emphasize

the "altruistic" and "moralistic" dimensions of ideology related to the notion of "*public interest*".[16] Indeed, ideology would "refer to […] personal definitions of the public interest, pursued as a consumption good that yields satisfactions in the form of moral sentiments" (Kalt and Zupan, 1990, p. 104). More generally, this approach supplies a residual definition of ideology that is all that cannot be explained by the strict self-interest assumption of the rational choice theory.

Already in the 1930s, Keynes (1936, pp. 383-384) opposed "vested interests" and "ideas". This opposition appears for the first time in our sample with the article of Mason (1963, p. 2), who proposed analysing political decisions "*under the headings of interests and ideologies*". We can see in Figure 1.8 that this approach appeared in the 1960s but really spread in the literature in the 1980s and especially from the reference article of Kau and Rubin (1979). In fact, this became the main approach in our sample in the 1980s and gave rise to a new strong definitional convergence. It supplied more articles in the 1990s, but not compared to the other set of definitions. We also notice that, whereas these definitions are provided by new journals, the older journals such as the *AER* adopted this approach at the expense of the *versus science definitions*. Moreover, if we consider that the approach pertains more generally to the opposition between ideology and rationality, we can include in this approach several articles from our sample that oppose a non-rational, ideological vote with a purely rational one based on "the professional qualifications, honesty, integrity or charisma of the candidates" (Andina-Díaz, 2006, p. 353), in other words the real valence or competence of a candidate (Bernhardt et al., 2011; Krishna and Morgan, 2011). This literature stands for a variant of the approach based on the irrational features associated with ideology.

All this trend of definitions pertains to a specific problem in economics. After having examined its own ability to produce scientific knowledge through the previous approach, economics scrutinized in a further step its basic behavioural assumption, namely the rational choice model. Facing the failures of this model to predict some observed behaviours, the standard economic theory had to account for what sounded like "dissonance", "anomaly" or "paradox" (North, 1992, p. 479; Sen, 2002, p. 24; Vanberg, 2008). Indeed, in some situations

[16] Kalt and Zupan (1984, p. 281): "Pure ideology, if it exists at all, is the manifestation of altruism in the political sector. [–] Indeed ideology appears to typically center around the equity side (rights and distributional assignments) of the economists' equity-efficiency dichotomy; […] In the jargon of recent research, the purported social objectives of political actors have been termed 'ideology'. Political ideologies are more or less consistent sets of normative statements as to best or preferred states of the world. Such statements are moralistic and altruistic in the sense that they are held as applicable to everyone, rather than merely to the actor making the statements. Accordingly, political ideologies are taken here to be statements about how government can best serve their proponents' conceptions of the public interest."

of collective choice, and more generally in politics, the rational choice model has seemed to be incapable of providing an account of some individuals' motivations and behaviours. Therefore a significant part of the literature aimed at knowing in which situations and to what extent individuals tended to adopt such irrational, benevolent or ideological behaviours, sometimes intending to remedy the flaws of the behavioural model of the standard economics. That gave birth to "revisionist strategies" consisting of slightly modifying the basic model of economic man in order to account for the observed behavioural anomalies. That allowed the explicative power of economics to be extended to new fields such as politics, in what was called "economic imperialism". To improve the predictive power of their model, it appears that standard economists were far more conciliatory with regard to the self-interest assumption than to the rationality assumption (Sen, 2002; Vanberg, 2008). This trend concerned in particular two issues: the paradox of collective action (Olson, 1965) and the seemingly uninterested individuals' behaviour in the political field – whether it be the paradox of voting or of campaign contribution or the assumption of general interest of politicians (Mueller, 2003).

This is reflected in our sample first with a significant number of articles that use the concept of ideology to overcome the paradox of collective action. Thus we noticed two kinds of "revisionist strategies" to explain the individually irrational participation in the provision of public goods. The first strategy drove some authors to consider ideology as an external constraint in the utility maximization problem. The constraint can be of a religious type in order to account for work (in)efficiency (Izraeli and Groll, 1980; Kimhi, 1998) or suicide attack (Wintrobe, 2006), or of a political type to explain the revolutionary strategies (Roemer, 1985) or the appointment process (Nixon, 2004). A second and more common strategy was to add ideological motivations, namely non-interested, along with motivations related to material interests as arguments of the individuals' objective function, thus considering ideology as an end per se. Most of the authors who did so referred to North (1981, pp. 45-58), who discussed the role of ideology in ameliorating free-riding behaviour when people have no material individual incentive to participate in the provision of a public good. By interpreting ideology as a "substitute for material incentives" (Mahoney, 2003, p. 236) that refer to "the utility which an individual obtains from identifying his interests with that of a group" (Kaempfer and Lowenberg, 1992, p. 420), the articles of our sample explained, in an "enlarged" rational choice framework, unionization (Barbash, 1943; Cell, 1980; Fones-Wolf and Fones-Wolf, 1981; Haberfeld, 1995), strike success (Friedman, 1988; Esteban and Ray, 1997; Dasgupta

and Kanbur, 2007), international relations (Kaempfer and Lowenberg, 1992; Mahoney, 2003) and more generally the provision of public goods (Mestelman and Feeny, 1988).

According to our sample, another part of the literature looked into the role of ideology as a determinant of choice by investigating the behaviour of politicians. A huge proportion of our sample, more than 50 articles, studied the relative part of ideological and interested motivations in the behaviour of political representatives and whether this part varies according to some situations. More precisely, the question was to know whether, in a period of election or, on the contrary, when representatives are immune to any electoral sanction, they change their behaviour. From the mid 1980s, the studies focused on representatives' voting patterns in the US Congress (Kau and Rubin, 1979; Kau and Rubin, 1984; Crain et al. 1986; McGuire and Ohsfeldt, 1986) and gave birth to the "shirking literature" that studied, in a formal principal-agent model, to what extent the elected representatives deviate from the implicit contract with their voters by not voting in accordance with the preferences of their constituency but with their own ideology. This issue gave birth to both formal and empirical studies in which ideology was measured as the residue of pure economic or electoral interests. Outside a principal-agent framework, other articles from our sample studied the relative importance of political-ideological factors and economic factors represented by campaign contributions or interest groups.[17] Although this approach gave rise to a strong quantity of empirical as well as formal studies, it seemed to be inconclusive with regard to the relative parts of ideology and interest that lead the politicians' behaviour and the specific issues on which representatives vote more ideologically (Kau and Rubin, 1993, p. 151; Mueller, 2003, p. 489).[18]

Besides this difficulty in reaching a consensus on its research agenda, this second approach to ideology has been much criticized because it provided a residual definition of ideology, as what does not tally with the self-interest assumption or more scarcely the rationality assumption of the rational choice theory. A debate related to the appropriate definition and

[17] They focus on the voting pattern of representatives on different issues such as public spending (Hird, 1993; Van Dalen and Swank, 1996; Galli and Rossi, 2002; Winer et al., 2008;), redistributive and fiscal policies (Kau and Rubin, 2002; Sobel and Wagner, 2004), public debt (Neck and Getzner, 2001) but also on free-trade/protectionist laws (Kahane, 1996; Kang and Green, 1999; Irwin and Kroszner, 1999) and privatization/liberalization (Ohsfeldt and Gohmann, 1992; Ramírez and Eigen-Zucchi, 2001; Christoffersen and Paldam, 2003; Duso and Seldeslachts, 2010).

[18] Kau and Rubin (1993, p. 151): "The […] question has been confused; some think that ideology and shirking are identical, although they are logically separate categories. We show that even if ideological shirking exists, it is relatively unimportant. We also show that self-interested (non-ideological) shirking exists." In a survey on the determinants of voting patterns of representatives, Mueller (2003, p. 489) seems to conclude that, even and especially on seemingly high ideological issues with no major economic stakes (like child labour), the representatives' votes are led by economic factors.

measure of ideology emerged in the shirking literature that wondered whether, with a residual definition, the role of ideology in representatives' behaviour would not have been overestimated because what was considered as ideology would be merely omitted interests (Peltzman, 1984, p. 210; Davis and Porter, 1989; Goff and Grier, 1993; Kau and Rubin, 1993; Seltzer, 1995, p. 1333). Thus Kau and Rubin (1982, p. 278) were among the first to argue in favour of "a measure of ideology independent of economic interest". In the same vein, Uslaner (1997, p. 243) proposed giving up the "shirking models based upon residualization" in favour of a "partisan approach" of ideology. That is why, from the 1990s, this approach has diminished in relative size compared to other approaches (see Figure 1.8). Although this approach represented a significant step compared to the previous approach in the shaping of *ideology* as an analytical tool for economists, it conserved some flaws of the latter. Indeed, ideology remained defined in a critical and evaluative way according to the self-interest criteria of the rational choice model. Moreover, by referring to an irrational behaviour, ideology kept its negative connotation.

1.4.3 THE PARTISAN APPROACH

A third significant group of definitions emerged from the content analysis. As with the *versus interest definitions*, no explicit definition is provided but it is identifiable by recurring terms associated with the word ideology (such as *political*, *party*, *partisan*, *position*, *sympathy*, *affiliation*, *tendency*, *right-left* and *liberal-conservative*). These terms systematically refer to the political dimension of ideology and more precisely to a spatial position on a left-right or liberal-conservative spectrum, according to a narrow interpretation of the Downsian conception of ideology (Downs, 1957). This partisan definition came from political science, in which it has become the dominant view (Knight, 2006), and was progressively adopted by economists facing the previously mentioned weaknesses of the *versus interest* approach. Contrary to both previous approaches, the partisan definitions are cleansed of any pejorative connotation and normative innuendo. Ideology is no longer what is not scientific or rational, and that should be so. Neither is it defined any longer in comparison with non-ideological forms. From a critical concept in contradiction with science or rationality, it became a neutral concept. The flip side of defining ideology in such a positive and non-evaluative way is that the concept is deprived of its richness to be reduced to the mere partisan or political affiliation of people.

Regarding our sample of articles, although a very few definitions of this kind started to appear from the 1960s, they really spread in literature in the 1990s to stand for a huge majority of definitions in the 2000s (see Figure 1.8). Like Knight (2006, p. 623) for political science, we observe a current definitional convergence in economics towards the partisan approach to ideology. We also notice that this convergence is not to be attributed to a cohort effect with the entrance of new journals in our sample but to a real conversion of the former proponents of the *versus interest definitions*. Indeed, the same journals that published during the previous decades papers based on the first and second approaches to ideology have widely resorted to the spatial Downsian definition. For instance, even *Public Choice*, which initiated the opposition between ideology and interest, widely adopted the partisan spatial approach from the 1990s.

This Downsian spatial approach to ideology pertains to a traditional debate in political science and history that has opposed the "convergence" hypothesis and the "politics matter" hypothesis (Imbeau et al., 2001). According to the former, differences among countries in political ideology, as well as in institutions and culture, do not matter when it comes to explaining policy outputs, because of the industrialization process in western countries (Thomas, 1980) or technological determinism (Skinner, 1976). On the contrary, according to the latter, variations in partisan variables explain variations in policy outputs (Castles and McKinlay, 1979). This research question gave birth to a plethoric empirical literature in the framework of the partisan theory (Hibbs, 1977) that was allowed by a simple spatial definition of ideology to be translated into a quantifiable measure. Knight (2006, p. 623) explained that the success of the partisan approach in political science is probably due to the ascension of quantitative methodology over the last half of the 20th century, but also to its simplification and intelligibility in the scientific discourse. We can assume that the strong convergence in economics towards this approach for the past two decades is probably due to the same reasons. But to which problem peculiar to economics does this approach to ideology correspond?

At first sight, the partisan approach presents only an empirical interest in economics that consists of studying the effect of the government's political affiliation on the economic aspect of the policy outcomes. Although this study is related to the research question of the *versus interest* approach, the two approaches are indeed different. For the latter, it comes down to knowing whether politicians behave only in an interested way. For the partisan approach, it comes down to measuring, without denying the importance of economic factors, the effect of political ideology on economic outcomes. As with our sample, a wide empirical literature

studied the effect of the government's political colour or political fragmentation on a wide range of policies, such as public spending (Borge, 1995; Cusack, 1997; Tellier, 2006; Potrafke, 2009), redistributive and fiscal policies (Borge and Rattso, 1997; Perotti and Kontopoulos, 2002; Tavares, 2004), public debt (Seitz, 2000; Balassone and Giordano, 2001), but also on free-trade or protectionist laws (Brady et al., 2002; Dutt and Mitra, 2005) and privatization and liberalization (Figueiredo, 2005; Bel and Fageda, 2009). A smaller literature in the field of law and economics investigated the independence of justice by assessing to what extent the cases' outcomes are influenced by the judge's political ideology (Ashenfelter et al., 1995; Lim, 2000; Revesz, 2000; Langer, 2003; Martin and Quinn, 2007; Smith, 2007). Generally speaking, this literature reached a consensus (Kau and Rubin, 1993, p. 151) to uphold that political ideology does matter, but that is not so overwhelming (Schmidt, 1996; Imbeau et al., 2001).

However, the stakes are not only empirical but theoretical. The theoretical debate pertains to the rationality assumption of the rational choice model and especially the individuals' learning process and the possibility of learning in politics. The "convergence" hypothesis would be in line with the standard economic theory that predicts the homogenization of the learning patterns when individuals face the same information. However the persistence of two different interpretation and action patterns, a left-wing one and a right-wing one, represents a puzzle for the standard economic theory. Facing the same reality, totally rational individuals should correct their learning patterns by a trial and error process. The problem becomes more acute when considering the assumption in the partisan literature over the agents' expectations that determine the duration of the effects of the political decisions. Under the rational expectation assumption, agents immediately anticipate the policies' effects, making them ineffective (Hibbs, 1977), while, under the adaptive expectation assumption (Alesina, 1987), the government can work on the national economy. But this effect is never lasting because the economic actors quickly correct their expectations. In short, according to the partisan spatial approach, political ideology can only be explained by a failure in the learning process, thus putting into question the second and more critical pillar of the standard behavioural model in economics. After some arrangements with the self-interest assumption enabled by the *versus interest* approach, this new approach to ideology seems to serve as a setback for the standard economic behavioural model. Therefore, in spite of the neutrality of the partisan-type definitions, it remains difficult to integrate the concept of ideology into the economic theory without sacrificing the funding rationality assumption of the economic man model.

The failure to totally rehabilitate ideology according to the standard economic theory is probably due to the oversimplification of the spatial definitions. They are said to derive from the original Downsian approach. Downs considered ideology as a low-cost signal about future voting patterns on a wide variety of issues about which voters are rationally less than perfectly informed (Downs, 1957). It is easy to see that the oversimplification made by the partisan approach lost the gist of the original Downsian conception of ideology. The problem of this simplification is that it focuses only on one part of the definition, namely the position of the politician in the political spectrum. It neglects the other basic part of the definition on the reasons for this behaviour: the low cost of the signal supplied by this spatial position in a context of imperfect information (Hinich and Munger, 1996, p. 2). By forgetting that adopting an ideological behaviour is first and foremost rational according to Downs (1957) in the sense that this allows the prohibitive costs of collecting information to be saved, this simplification leads to a paradoxical situation. Indeed, if we neglect the informative function of ideology of supplying information and of allowing communication in politics, ideology is no longer rational and even becomes the problem to cope with in the relationship between voters and their representatives. Whether one considers the role of signalling in an uncertain and imperfect information political world or not, ideological behaviour can be interpreted either as "shirking" and a plague for representative democracies or as "signalling" that streamlines the democratic process (Nelson, 2002, p. 519). Therefore some authors have proposed coming back to the initial Downsian approach focusing on information to re-evaluate and explain the seemingly irrational feature of ideology. It gave birth to a new strategy for rationalizing ideology according to the rational choice model. By relaxing the assumption of substantive rationality and by assimilating costly and scarce information to a good, per se (Arrow, 1971; Stigler, 1971), it becomes rational to be ideological.

1.4.4 TOWARDS THE "COGNITIVE APPROACH"

This concern to rationalize ideological behaviours gave rise to a fourth and last set of definitions based on the informative function of ideology. As opposed to the previous substantive definitions of ideology, the "cognitive" approach has supplied procedural definitions, focusing on the process of the mind, i.e. how humans perceive, remember, learn and think about information. This approach is identifiable in our sample by inference from words related to information and more generally the human information handling process

(such as *information*, *informative*, *signal*, *cognition*, *cognitive*, *interpretation*, *interpret*, *perception*, *description*, *prescription*, *(self-) definition*, *pattern* and *system*).

This approach first appeared in our sample in the late 1950s with Matossian (1958, p. 218), who developed the ideology's role of "self-definition", "description" and "imperative".[19] It reappeared in the 1970s with Lau and Frey (1971, pp. 21-22), who assimilated ideology with a preference for ordering over the set of possible alternatives, and with Brunner and Meckling (1977, p. 73), who stressed "the informative value" of ideology through cognitive procedures. While these definitions seem to be marginal in literature in view of our sample, they grew in importance in the late 1990s and in the 2000s, as we can see in Figure 1.8. Among these definitions, we can see that some of them insist on ideology's positive role in providing people with patterns to interpret information, while others focus on the normative function of ideology to supply individuals with behavioural patterns based on rules in specific situations. The authors who focus on the descriptive function often supply definitions close to the original comprehensive definition of Downs in terms of signalling. That led Wright (1993, p. 104) to assert that "rather than becoming informed about every issue […], voters can vote for politicians whose general ideological outlook is similar to their own". Thus it is in politicians' interest to maintain their ideological reputations. An ideological reputation acts as a "hostage" or "brand name". Because individuals have little incentive to monitor their representatives' voting record, an ideological reputation provides a signal as to how they will vote in the future (Lott, 1987; Seltzer, 1995, p. 1305). We find in our sample other articles that dwell on this aspect of ideology (Dougan and Munger, 1989; Wright, 1993; Bonilla, 2004; Wärneryd, 1994). On the other hand, other definitions highlight the normative role of ideology, by assimilating it either as an order of possible social states (Lau and Frey, 1971, p. 21-22; Bisin and Verdier, 2000, p. 7) or as "supreme values" (Bernholz, 2001, p. 35; Bernholz, 2006, p. 224) or "higher-order beliefs" (Hoff and Stiglitz, 2010, p. 11).

By taking cognition into account, this approach allows a better understanding of the process of change since, through examining individual choice, it accounts for the formation of collective beliefs that can stabilize or generate equilibrium. In other words, the purpose of the approach is to explain the role of beliefs in situations of change and inertia. As soon as one starts to consider the assumption of imperfect information, the model of rational choice is no

[19] Matossian (1958, p. 218): "Ideology may be defined as a pattern of ideas which simultaneously provides for its adherents: (1) a self-definition, (2) a description of the current situation, its background, and what is likely to follow, and (3) various imperatives which are 'deduced' from the foregoing. In ideology there is a strong tendency to merge fact and value, to superimpose upon 'things as they are' the things that are desired."

longer able to explain changes in preferences, tastes or beliefs, considered as stable (Stringham and Hummel, 2010), and neither is it able to predict equilibrium situations. Indeed, the rational expectations lead to a situation in which all is possible, a multitude of possible equilibria can occur. Taking into account the process of ideologies' formation and their crystallization into shared mental models (Denzau and North, 1994)[20] can enable us to explain the persistence of institutional equilibrium and the passage from one equilibrium to another. The integration of ideology into the explanation of the process of change is mainly to be attributed to North. He insisted on the shared feature of ideology to emphasize the phenomenon of "ideological conformism" that reduces the cost of maintaining order by avoiding the cost of sanction mechanisms of deviant behaviour (North, 2005). In this case, the institutional equilibrium is strengthened by ideology. North and co-authors also propose explaining the process of change, and especially institutional change, through the formation and evolution of ideologies (Mantzavinos et al., 2004).

Contrary to the other above approaches, the cognitive approach can no longer consider ideology as a mere fact but has to explain its formation and its effects in terms of change or inertia. Like Hinich et al. (1998, p. 404), a substantial part of our sample articles addresses the issue of "stability and change in a macropolitical context" in a "tradition of thought on dynamic processes". Indeed, some articles propose an endogenous theory of ideology in which ideology interacts with another variable such as economic policy (Lau and Frey, 1971; Chai, 1998), party platforms (Poutvaara, 2003) or opinion polls (Cukierman, 1991). In these theories, ideology is explained by the circular effects with the other variable, but is also simply explained in our sample by the formation of the economic beliefs of the economists (Caplan, 2002) and of voters (Caplan, 2006), by media (Schulz and Weimann, 1989; Bovitz et al., 2002; Andina-Díaz, 2007; Bernhardt et al., 2008; Hargittai et al., 2008) or by political institutions (Besley and Case, 2003; Bernhardt et al., 2004; Schultz, 2008). All these articles share a focus on the cognitive feature of ideology to explain the formation of ideology and its effect on formal (political) institutions.

[20] In a reference article on ideology, written by Arthur Denzau, he specifies his definition by considering ideologies as "the shared framework of mental models that groups of individuals possess that provide both an interpretation of the environment and a prescription as to how that environment should be structured" (Denzau and North, 1994, p. 4). North initially defined ideology as "the subjective frameworks that individuals possess to explain the world around them. Ideologies contain an essential normative element; that is, they explain both the way the world is and the way it ought to be. […] There are usually elements of an organized structure that make them an economizing device for receiving and interpreting information" (North, 1992, p. 484.)

Other articles from our sample study the possible opposite role, the "reinforcement effect", of ideology on informal institutions, either in the economics of transition, where ideology would slow down the reform process (Jing'an, 1987; Wolgin, 1997), or in the study of cultural or social transmission, where ideology promotes social rigidity (Bisin and Verdier, 2000; Hoff and Stiglitz, 2010). In any case, when focusing on individuals' cognitive process, ideology appears as a central concept to understand the formation and persistence of institutional equilibrium. Without depriving the concept from all its richness, like the partisan definitions did, this approach makes ideology an effective analytical tool for economists. This approach goes further than the partisan spatial approach because it adopts a procedural approach to ideology able to explain the formation of ideology and to endogenize the concept in order to explain a wider range of phenomena. But it also probably contains the most significant criticism of the rational choice theory thought the prescriptive or normative feature of ideology. By emphasizing the fact that individuals can adopt behaviours led by moral rules or ethical values, it denies the consequentialist assumption of the rational choice model.

1.5 CONCLUSION

The present article proposed taking stock of the treatment of the concept of ideology in economics. We use an original bibliometric methodology to study the treatment of the concept of ideology in the economic journals available on the JSTOR and ECONLIT databases. We focused our analysis on 45 top-ranked journals and especially 246 articles with ideology as a main topic. It first appeared that, contrary to what is usually thought, the notion of ideology has been more and more present in economic literature, in a growing number of articles published in a growing number of economic journals. It seems also that, although economists became interested in *ideology* a few decades later than other social scientists, from then, i.e. the 1920s, they have produced a constant and significant part of all the studies on *ideology* in all social sciences. Three main results emerged from the bibliometric analysis of the sample articles. First, from the 1920s-30s onwards, economists have shown a growing and significant interest in the concept of ideology. Second, this interest has given rise to four well-identified approaches to ideology at different times. Third, these four generations of approaches enlightened and undoubtedly contributed to the evolution of economics.

A content analysis of the sample articles revealed that four main approaches to ideology have prevailed in economics at different times. Through a technique of inference, we

identified four groups of definitions supplied in the articles. First, following a long tradition in science opened by philosophy and sociology, economists considered ideology as opposed to science or truth in a majority, at least until the 1950s-60s. Then the new definitional paradigm was to define ideology as opposed to rationality and especially self-interest. This trend culminated in the 1980s and has since progressively regressed. But, for the two last decades, borrowing the definition of social scientists, a majority of economists have focused on the political/partisan dimension of ideology. Lastly, a minority of economic studies have placed the notions of information and cognition at the heart of their approach to proposing a procedural definition of ideology. From this evolution, we can see that economists tended to move from a critical notion towards a neutral one. Indeed, initially defined as what is not scientific or rational, ideology was then defined in a non-evaluative way, as a simple political position or a way of treating information. We also noticed that economists tended to borrow the definitions of other disciplines, such as the *versus science* or the *partisan* definitions, but were also able to propose original definitions such as *versus interest* and the *cognitive* approach.

Both tendencies are revealing of the way in which economics managed to make ideology an analytical tool that is in line with the standard economic theory or that could contribute to improving it. Indeed, by tending towards more and more neutral conceptions of ideology and by producing their own definitions, economists could contend with or circumvent the deadlocks of the standard economic theory. Indeed, it emerged in the content analysis that every definition referred to a specific theoretical debate. The *versus science* approach tackled the epistemic issue of the process of knowledge production, and the papers within this approach tried to identify the potential biases inherent to researchers in the production of economic science. This first approach was the opportunity to reflect on the scientificity of economic science. In this vein, the *versus interest* definition focuses on one specific foundation of the economic theory, the assumption of self-interest in the rational choice model. Facing the dissonance of the theoretical predictions and observed ideological behaviours, a first “revisionist strategy” consisted of relaxing the assumption of self-interest by including additional arguments in the utility function, thus increasing, in a tradition of economic imperialism, the explicative power of the rational choice model.

Contrary to the *versus interest approach*, the partisan approach, inherited from political science, was not devised to challenge an economic theoretical problem but rather had an empirical vocation. Nevertheless, it contributed, maybe unconsciously, to strongly questioning the standard behavioural model in economics. Emphasizing the permanence of

the diversity, or at least the duality, of the patterns of interpretation of the world, it opposed the rational model that predicts the convergence of patterns led by an objective learning process. It implicitly suggests an alternative behavioural assumption in which the rationality can be subjective. Finally, the cognitive approach examines a hole in the standard economic theory, through the formation of equilibrium and the persistence of suboptimal equilibrium. It proposes solving this puzzle by investigating the process of formation of individual and common beliefs. Focusing on the informative value of ideology in an uncertain world, this approach offers a second revisionist strategy to explain ideological behaviours with the rational choice theory. This approach seems to stand for a looming and fruitful approach and research agenda.

A peculiar feature of the economic approach appears from this study of the treatment of ideology. While the concept of ideology has systematically brought into question the basic behavioural assumptions of economics and even its scientificity, economists, at least some of them, have tried, more or less successfully, to address the loopholes and to integrate ideology into economic theory. This emphasizes a potential bias of our study which focuses mainly on the orthodox studies published in the top-ranked journals. Indeed, by focusing on the "mainstream" approaches to ideology, we have analysed more the way the economists "successfully" addressed the challenges than their failures, for instance, emphasized by North, whose work is not taken into account in our sample. That is why it would be interesting to compare these results with the papers coming from other journals, which are probably less optimistic about the ability of mainstream economists, and especially the rational choice model, to integrate the concept of ideology. We are totally aware of the potential limits of such a work, but in the absence of recent assessment on the studies on ideology in economic literature, these preliminary conclusions are valuable and could enable scholars to better orient their studies on ideology and to look ahead.

APPENDIX

Table 1.1
Presentation of the journals

Abbreviation	Name of Journals	Start	End
AER	Amercian Economic Review	1911	2007
AJAE	American Journal of Agricultural Economics	1968	2004
AJPH	American Journal of Public Health	1975	2008
BPEA	Brookings Papers on Economic Activity	1970	2008
E	Econometrica	1933	2009
EDCC	Economic Development and Cultural Change	1952	2009
EG	Economic Geography	1925	2004
EHR	The Economic History Review	1927	2009
EJ	The Economic Journal	1891	2009
EJHET	European Journal of the History of Economic Thought	1993	2009
ET	Econometric Theory	1985	2010
ET	Economic Theory	1991	2009
Etrans	Economics of Transition	1999	2008
HPoE	History of Political Economy	1969	2010
IER	International Economic Review	1947	2007
ILRR	Industrial and Labor Relations Review	1947	2007
IRLE	International Review of Law and Economics	1981	2010
JCE	Journal of Comparative Economics	1977	2010
JDE	Journal of Development Economics	1974	2010
JE	Journal of Econometrics	1973	2010
JEG	Journal of Economic Geography	2001	2010
JEH	The Journal of Economic History	1941	2004
JEL	Journal of Economic Literature	1969	2008
JEP	Journal of Economic Perspectives	1987	2007
JET	Journal of Economic Theory	1969	2010
JHE	Journal of Health Economics	1982	2009
JIE	Journal of International Economics	1922	1996
JIE	Journal of Industrial Economics	1952	2009
JLabE	Journal of Labor Economics	1983	2007
JLE	Journal of Law and Economics	1958	2009
JLEO	Journal of Law, Economics, and Organization	1985	2008
JLS	Journal of Legal Studies	1972	2008
JMathE	Journal of Mathematical Economics	1974	2010
JMCB	Journal of Money, Credit and Banking	1969	2009
JMonE	Journal of Monetary Economics	1975	2010
JPE	The Journal of Political Economy	1892	2009
JPubE	Journal of Public Economics	1972	2010
JUE	Journal of Urban Economics	1974	2010
PC	Public Choice	1968	2008
QJE	Quarterly Journal of Economics	1886	2004
RAND	The RAND Journal of Economics	1984	2007
RES	Review of Economic Studies	1933	2006
REStat	Review of Economics and Statistics	1919	2004
SCW	Social Choice and Welfare	1984	2010
WBER	The World Bank Economic Review	1986	2002

2. GOVERNMENT SIZE AND ECONOMIC PERFORMANCE: FRANCE IN THE 20TH CENTURY[1]

2.1 INTRODUCTION

Government has benefits and costs. The benefits include provision of public goods and resolution of externality problems, aspects of social justice, and regulation for consumer protection; the costs are the excess burden of taxation, incentives for unproductive use of resources in rent seeking, and the consequences of principal-agent problems between citizens and both politicians and bureaucrats (Hillman, 2009). The benefits and costs suggest an optimal size of government.

We define government size by the proportion of public spending to output and investigate the nonlinear relation between the government size and national output. The size of government is of course not only measured by public spending and the consequences of government are not only the value of output produced. We focus however on these measures. Our question is how public spending affects efficiency in the economy as measured by output.

Past empirical studies investigating a linear relationship between public spending and output have been inconclusive.[2] Faced with this, the literature has taken two paths. The first, following endogenous growth theory, consists of disaggregating the effects of public expenditure to investigate the performance of each expenditure component (Angelopoulos et al., 2007; Afonso and Furceri, 2010). The second approach explores the nonlinearity hypothesis or the BARS curve derived from Barro (1989), Armey (1995), Rahn and Fox (1996) and Scully (1994). In previous literature, Grossman (1987, 1988) proposed a theoretical framework to account for a nonlinear relationship based on public goods and the

[1] This essay is based on Facchini and Melki (2011).

[2] For recent literature reviews, see Nijkamp and Poot (2004) and Ciccone and Jarocinski (2010). In other literature surveys, Bergh and Henrekson (2011) and Pitlik and Schratzenstaller (2011) established that no recent study finds a positive relationship between government size and output.

excess burden of taxation and disincentives of transfer mechanisms, as well as rent-seeking activities. Market and state failure can be invoked to justify the nonlinearity hypothesis, as well as the distinction between productive and non-productive public expenditure (Barro, 1990; Lee, 1995; Devarjan et al., 1996; Chen, 2006). As Tanzi and Zee (1997) and Tabellini (2005) emphasize, it is generally difficult for external observers to determine the difference between productive and counterproductive spending.

The literature on the nonlinearity hypothesis has several problems. Past cross-country studies assume that all countries have the same government size. The time-series studies focusing on one country differ in their methodologies and observation periods, making the results difficult to interpret.[3] There are also ambiguities and inaccuracies in these studies. First, there is lack of consistency regarding whether the economic performance variable explained by government size is the level[4] or the growth rate of GDP.[5] The level of output and the growth rate of output are not completely interchangeable from a theoretical perspective. From an empirical perspective, problems of spurious time-series regression can arise, because the variables government size and GDP are usually found to be non-stationary. The empirical literature is also unclear concerning whether the nonlinearity hypothesis refers to a short-term effect or to an equilibrium long-term effect of government size[6].

We address these issues by setting out the relationship between government size and the level of output. We also address the issues empirically by estimating both a long-term co-integration relationship and the short-term interactions between government size and GDP. We employ the two-step Engle-Granger (1987) co-integration method to estimate a nonmonotonic model in which real GDP is explained by government size and squared government size measured by the proportion of total public spending in GDP, and we add economy openness, population size, and the proportion of taxes in GDP.

We find evidence of a co-integration nonmonotonic relationship between government size as indicated by public spending and real GDP in France for the time period 1896–2008. The estimated coefficients indicate that the optimal government size in France is 30% of GDP. The evidence for the French case allows a comparison with similar long time-series studies

[3] Forte and Magazzino (2011) propose evidence of the diversity of the optimal size of public spending using time-series and panel data on European countries in the period 1970-2009.

[4] See for example Armey (1995) and Vedder and Gallaway (1998). Grossman (1988) studies the relationship between a change in government size and GDP growth.

[5] See for example Gwartney et al. (1998), Forte and Magazzino (2011), Mittnik and Neumann (2003).

[6] In the literature on the Wagner's law, some studies estimate a linear cointegration relationship between government size and GDP (Henrekson, 1993; Bohl, 1996; Payne and Ewing, 1996; Ghali, 1998; Kumar at al., 2012).

that exist only for the U.S. (Grossman, 1987; Peden, 1991; Scully, 1994; Vedder and Gallaway, 1998).[7]

The nonmonotonic relationship is also observed when estimating the short-term interactions among the variables. This last finding is robust to splitting the observation period into sub-samples before and after the Second World War. The Granger-causality tests indicate that the relationship found is due to unidirectional causality from government size to output.

The paper proceeds as follows. Section 2 reviews the literature and revisits the non-linearity hypothesis. Section 3 describes the econometric model and methodology. Section 4 provides the results, which are discussed in section 5. Section 6 concludes.

2.2 LITERATURE SURVEY: LINEARITY VS. NONLINEARITY HYPOTHESES

2.2.1 LINEARITY HYPOTHESIS

The relationship between government size and economic outcomes was initially studied in the framework of a linear model using a Cobb–Douglas production function and was first developed by Feder (1982) and adapted by Ram (1986). Since then, the issue has given rise to a plethora of empirical studies. Nijkamp and Poot (2004) provide a comprehensive meta-analysis of 93 studies, undertaken prior to 1998, on the effects of total and specific public expenditure and tax rates on economic performance. They conclude that, if the positive influence of public spending on education and public infrastructure is confirmed, it is difficult to reach an agreement on the effect of total public spending on national output.

We consider the 41 studies of the meta-analysis of Nijkamp and Poot dealing only with the effect of total public expenditure. We update and complete the meta-analysis with 41 additional recent studies. A better understanding of the contradictory effects of government size on economic output revealed in the different studies requires an in-depth analysis of the periods and the panels of the countries considered in each study. We also suggest examining more deeply the form of the estimated model (linear or nonlinear). The traditional surveys, like that of Nijkamp and Poot (2004), merely provide the sign (positive, negative or inconclusive) of the relationship without specifying the form of the equation that is tested.

[7] In 1960, the size of the public sector was pretty much the same in almost all the Western developed economies (Henrekson and Lybeck, 1988; Tanzi and Schuknecht, 2000). But in the late 1990s, total government spending was about 50% in many countries of continental Europe, like France, and around 35% in the United States, Japan and Switzerland (Persson and Tabellini, 2003).

Thus, they could classify a study as inconclusive when it provides no evidence of a linear relationship but of a nonlinear relationship between government size and economic output, such as Grossman (1987) does. Therefore, in our analysis, we add a fourth possible effect besides positive, negative and inconclusive, which is a nonlinear inverted U-shaped curve.

Table 2.1
Studies estimating a linear model

	negative effect	**positive effect**	**inconclusive**
OECD countries	Ahmed (1986) Marlow (1986) Peden and Bradley (1989) Engen and Skinner (1992) Evans and Karras (1994) Hsieh and Lai (1994) Hansson and Henrekson (1994) Verder and Gallaway (1998) Grier (1997) Fuente (1997) Karras (1996) Gwartney et al. (1998) Abrams (1999) Bernholz (2000) Dalamagas (2000) Bassanini and Scarpetta (2001) Fölster and Henrekson (2001) Alesina et al. (2002) Dar and Amirkhalkhali (2002) Illarionov and Pivarova (2002) Borcherding et al. (2003) Kustepoli(2005) Schaltegger and Torgler (2006) Angelopoulos et al. (2007) Romero-Ávila and Strauch (2008) Roy (2009) Afonso and Furceri (2010) Bergh and Karlson (2010)	Bairam (1990) Macnair et al. (1995)	Saunders (1985) Levine and Renelt (1992) Sheehey (1993) Gemmell (1993) Andres et al. (1996) Agell et al. (1997) Ghali (1999)
Developing countries	Landau (1983) Assane and Pourgerani (1994) Hansson and Hebrekson (1994) Karikari (1995) Guseh (1997) Zhang and Zou (1998)	Sattar (1993) Cooray (2008)	Cronovith (1998) Bairam (1990) Fidrmuc (2003) Anaman (2004)
OECD and developing countries	Landau (1983) Barth and Bradley (1987) Grier and Tullock (1989) Rao (1989) Barro (1990) Lee (1995) Barro (1997)	Ram (1986)	Kormendi and Meguire (1985) Scully (1989) Lee and Lin (1994) Lin (1994)

Among the 82 studies of our sample, the majority, namely 61, test a mere linear relationship between government size and output (Table 3.1), while 21 estimate a nonlinear

model (Table 3.2). As we can see in Table 3.1, which presents the results of the studies estimating a linear model, 67% find a negative effect of government size, while only 8% find the opposite effect, and 25% are inconclusive. The convergence toward a negative influence of government size becomes even more evident when considering the studies, whether in cross-section or in time series, that focus on developed OECD countries. In fact, 76% of the studies uphold a negative effect, while only 5% establish a positive effect and 19% find no relationship. The negative effect seems to be slightly less prominent for developing countries and in the studies that include both kinds of countries. Indeed, concerning solely developing countries, 50% of the sample articles show a negative effect, 17% a positive one and 33% are inconclusive. Likewise, the cross-country studies that focus on both developing and developed countries provide evidence of a negative effect in 58% of the cases, a positive one in 9%, and no clear effect in 33% of the studies. The indication is that the effects of government size differ according to the level of development of the countries considered.

All the 61 “linear” studies focus on a relatively recent period, namely the second half of the twentieth century, except Ahmed (1986), whose observation period is 1908–1980. This strengthens a proposal that the apparent negative effect is valid only for a recent period. This period is characterized by relatively large government size, especially for developed countries and we can assume that the seemingly negative effect applies for a relatively high share of public expenditure in national income. This is exactly what the small amount of literature on the optimal size of government tends to show.

2.2.2 NONLINEARITY HYPOTHESIS

We looked at 21studies estimating a nonlinear relationship between government activity and economic performance (Table 2.2). According to these studies, the optimal size of government can vary from around 17% to 43.5%of GDP. Most of these studies focus on the United States and they tend to converge toward a 20% ratio (Grossman, 1987; Peden, 1991; Scully, 1994; Vedder and Gallaway, 1998). Regarding other countries, the studies most often find higher optimal sizes, such as 27% for Canada (Chao and Gruber, 1998), 27% for Sri Lanka (Herath, 2009), 35% for Iran (Abounoori and Nademi, 2010), 35% for 23 OECD countries (Afonso et al., 2003), 40% for low-income countries (Davies, 2009), around 40%

for European countries (Forte and Magazzino, 2011[8]; Pevcin, 2004[9]) and between 40% (Forte and Magazzino, 2011) and 43% (Pevcin, 2004) for France. Bulgaria and Taiwan appear to be exceptions with low optimal sizes, respectively of 21% (Mavrov, 2005) and 23% (Chen and Lee, 2005). The seemingly low optimal size of 20% found by Mittnik and Neumann (2003) for Germany relates only to consumption expenditure.

The studies tend to confirm the global negative effect of government size in the second half of the twentieth century found in the "linear-model" studies. Indeed, most of the countries would be on the downward-sloping portion of their inverted U-shaped curve during this period. This effect would be all the more negative when considering rich OECD countries because they would have a lower optimal size. Table 2.2 also shows that the different studies on specific countries converge more or less towards similar but not identical optimal sizes. Even though the optimal sizes provided by the various studies can hardly be compared because of significant methodological differences, such as the models used to assess or the observation periods, Table 2.2 provides a second indication. There would be a diversity of optimal sizes specific to each country.

[8] Forte and Magazzino (2011) find a 37% average optimal state size for Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and the UK.
[9] Pevcin (2004) finds a 36–43% optimal government size for eight EU countries: Italy, France, Finland, Sweden, Germany, Ireland, the Netherlands and Belgium.

Table 2.2
Studies estimating a non-linear model

author	period	sample	optimal size
Grossman (1987)	1929–1982	USA	19
Grossman (1988)	1929–1982	USA	-
Peden (1991)	1929–1986	USA	20
Carlstrom and Gokhale (1991)	Post-war	USA	-
Karras (1993)	-	-	20
Scully (1994)	1929–1989	USA	21.5–22.9
Karras (1996)	1960–1985	118 countries	23
Vedder and Gallaway (1998)	1947–1997	USA	17
Chao and Gruber (1998)	1929–1996	Canada	27
Scully (2000)	1995	22 OECD/112 countries	20.2–22.3
Afonso et al. (2003)	1990–2000	23 OECD countries	35
Mittnik and Neumann (2003)	1968-1994	West Germany	20
Mavrov (2007)	1990–2004	Bulgaria	21.4
Pevcin (2004)	1950–1996	12 EU countries	36–42
Chen and Lee (2005)	1979–2003	Taiwan	23
Magazzino (2008)	1950–1998	Italy	33
Davies (2009)	1975–2002	low-income countries	40
Chobanov and Mladenova (2009)	1970–2009	28 EU countries	25
Herath (2009)	1959–2003	Sri Lanka	27
Abounoori and Nademi (2010)	1956–2006	Iran	34,7
Forte and Magazzino (2011)	1970–2009	27 EU countries	35.39–43.50

Notes: Optimal size = percentage of total public expenditure in GDP, except Mittnik and Neumann (2003) who consider only consumption expenditure and Scully (2000) who considers the optimal tax rate.

2.2.3 REVISITING THE NONLINEARITY HYPOTHESIS

For the nonlinear relation depicted in Fig. 2.1.a, optimal government size is G^*. Each dollar spent by the public sector implies a benefit and a cost, where F = B – C. The total effect of government intervention traditionally aggregated in the nonlinear curve, *F*, can be

decomposed in the benefits from public spending, *B*, and the inefficiency costs, *C*. The relationship is presented graphically in Fig. 2.1b.

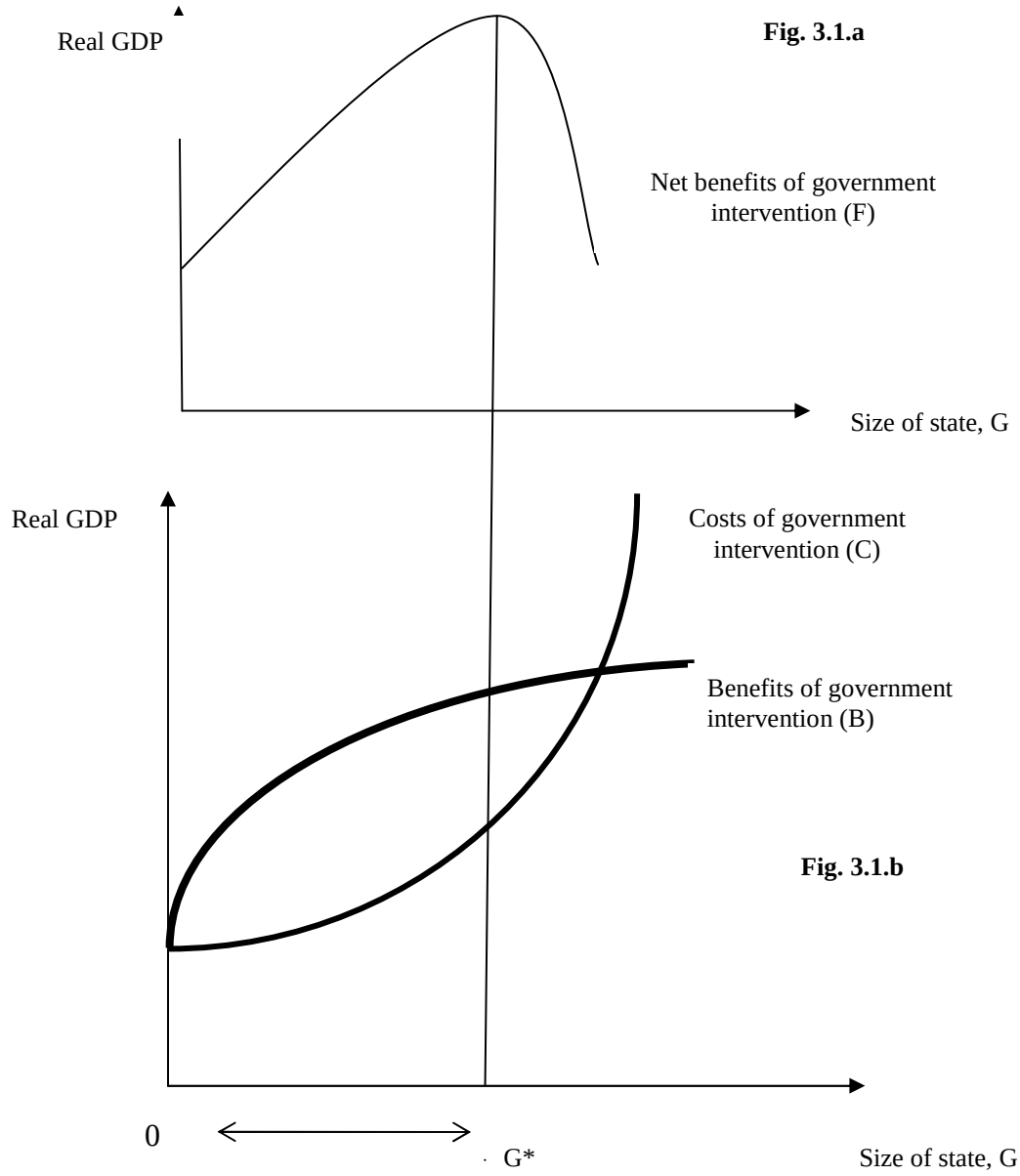

Fig. 2.1
Decomposition of the non-linear effect of government size on output

To account for the shape of the curve of the net benefits, *F*, we need to justify the shapes of the *B* and *C* curves. By definition, the *B* curve, representing the benefits from correcting market failures, always increases with the government size, i.e. $B'(G) > 0$. However, but it is increasing at a decreasing rate, thus $B''(G) < 0$. That is explained by the law of diminishing returns. Indeed, state intervention first corrects the most profitable market failures, for

instance by securing the property rights, and progressively sustains less and less profitable activities.

Concerning the costs of public expenditure inherent in state failures, by definition, the slope of the C curve is positive, $C'(G) > 0$. Furthermore, we argue that the slope is increasing, that is to say, $C''(G) > 0$. In other words, the costs of public spending increase continuously at an increasing rate (Fig. 2.1.b).

The acceleration of the costs of public spending with government size lies at the heart of our contribution. We supply three reasons to explain it. First, the crowding-out effect increases more than proportionally with the size of the government, because government prices increase at a higher pace than private sector prices. The different rates of price changes can be explained by the Baumol's cost disease of the service sector (Baumol, 1967) or can result from the political power of civil servants themselves (Buchanan and Tullock, 1977: 148). With Baumol's hypothesis, the public sector is less likely to generate productivity improvements. The growing cost of government is explained by the relative productivity of the public and private sectors. In Buchanan and Tullock's hypothesis, the explanation is different. As the share of the electorate made up of bureaucrats increases their voting power increases. This increased voting power enables appointed public officials to extract higher wages from elected public officials. Public sector price increases are generated via the electorally coercive relationship between bureaucrats and politicians. The higher the wages of bureaucrats, the higher the cost of public spending.

Second, what we can refer to as the "systemic crowding-out effect" takes place when the government size increases. Indeed, market prices solve the knowledge dispersal problem. They transmit already-known information and contribute to the process of the formation of opinions (Hayek, 1949, 96–106; Kirzner, 1984: 204). Then, competition in the market process is a discovery procedure. The inefficiency of the market can be solved because entrepreneurs perceive in the inefficiencies the opportunities to rearrange the pattern of input utilization or output consumption and to correct their expectation errors (Kirzner, 1978), i.e. the opportunities for pure entrepreneurial profits. Public spending to correct market failures deprives the members of solutions that the market process would have discovered. We can speak about a systemic crowding-out effect because it can reduce both the economic knowledge available on the market and the number of participants.

Third, the political transaction costs increase more than proportionally with the size of the government because the displacement costs within the public sector increase with the competition between the various interest groups. The intensity of competition increases with

the size of the government because public resources become scarce. The pro-education groups or the pro-safety ones spend more to obtain the marginal dollar.

2.3. MODEL AND METHODOLOGY

2.3.1 SPECIFICATION ISSUES

Investigating the nonlinearity hypothesis between economic activity and government size over a long period inevitably involves tackling some specification issues. Most often, the relation between economic activity and government size is studied through the estimation of a Cobb–Douglas production function. However, in addition to important limitations (Bairam, 1990: 1427; Hill, 2008), these kinds of models do not take into account the possibility of a nonlinear relationship. The empirical literature investigating the nonlinearity hypothesis, though, is suspiciously free from control variables. A fairly well-developed empirical literature emphasized a small set of variables that are typically useful in the growth model but standard variables are missing for our long time period. Consequently, shortcuts like including economy openness, total population or the proportion of taxes in GDP along with the proportion of public expenditure in GDP are important controls. A variable measuring the proportion of taxes in GDP enables us to look at the effect of the proportion of public expenditure in GDP on economic activity holding taxes constant. As our focus is on the relative advantage of the nonlinearity hypothesis, our time-series investigations are conducted using two different specifications: (i) a monotonic model including real GDP, government size, economy openness, total population and taxation; (ii) a nonmonotonic model including the government size squared along with the variables of the first specification.

2.3.2 CO-INTEGRATION ANALYSIS

Another limitation of the few time-series studies that investigate the nonlinearity hypothesis lies in the fact that they do not test for co-integration and provide only a short-run analysis of the relationship between government size and economic output. Briefly stated, evidence of the co-integration of a set of variables that are integrated of the same order implies a long-run relationship between these variables. In other words, any deviations from the long-run equilibrium relationship will be corrected. This means that two important forces

can cause a change in the variables. A short-term effect indicates the response for one variable due to the changes in another variable. The other force refers to the adjustment taken by the variables to correct any deviation from the equilibrium.

To test for co-integration, two commonly used tests are employed – the residual-based test of Engle and Granger (1987) (EG test) and the VAR-based test of Johansen (1988) and Johansen and Julius (1990) (JJ test). As our aim here is not to investigate all the possible co-integration relationships between the variables of our model, as intended by the JJ test, we use an EG test, which imposes a unique co-integration vector. This test is a two-step procedure involving an OLS estimation of a pre-specified co-integration regression and of the error-correction model based on the error terms of the first regression. In view of the above discussion, we are led to estimate, for the whole period 1896-2008, two error-correction models, a monotonic one given by equation (1) and a nonmonotonic one given by equation (2):

$$\Delta Y_t = c_0 + \gamma_0 \left(Y_{t-1} - (\beta_1 G_{t-1} + \beta_2 O_{t-1} + \beta_3 P_{t-1} + \beta_4 T_{t-1})\right) + \sum_j \lambda_{1,j} \Delta G_{t-j} + \sum_j \lambda_{2,j} \Delta O_{t-j} + \sum_j \lambda_{3,j} \Delta P_{t-j} + \sum_j \lambda_{4,j} \Delta T_{t-j} + \sum_j \lambda_{5,j} \Delta Y_{t-j} + D_{WWII} + \varepsilon_t \quad (1)$$

$$\Delta Y_t = C_0 + \Gamma_0 \left(Y_{t-1} - (B_1 G_{t-1} + B_2 (G_{t-1})^2 + B_3 O_{t-1} + B_4 P_{t-1} + B_5 T_{t-1})\right) + \sum_j \Lambda_{1,j} \Delta G_{t-j} + \sum_j \Lambda_{2,j} \Delta (G_{t-j})^2 + \sum_j \Lambda_{3,j} \Delta O_{t-j} + \sum_j \Lambda_{4,j} \Delta P_{t-j} + \sum_j \Lambda_{5,j} \Delta T_{t-j} + \sum_j \Lambda_{6,j} \Delta Y_{t-j} + D_{WWII} + \Sigma_t \quad (2)$$

with *t* = year *t*; Δ = difference operator; Y_t = real GDP at *t*; G_t = government size at *t*; $(G_t)^2$ = government size squared at *t*; O_t = economy openness at *t*; P_t = total population at *t*; T_t = taxation at *t*; D_{WWII} = time dummy post World War II; c_0 and C_0 = constant terms; γ_0 and Γ_0 = speed of adjustment to long-term equilibrium; β_i and B_i = long-term impacts; λ_i and $\Lambda_{i,j}$= short-term impacts of the *j*-lagged variable; ε_t and Σ_t= error terms at *t*; $-B_2/2B_1$ = the long-term optimal government size.

The estimation of these models, however, has to take into account the structural breaks in our data. Indeed, as Mittnik and Neumann (2003) suggest, structural changes may dominate nonlinearity effects. In particular, the potential optimal government size found for the period 1896-2008 can be strongly affected when taking account of the structural changes after the Second World War. In particular, the building of the Welfare State sharply influenced both the composition and the size of public expenditure. The issue of the breaks in our series are

more extensively discussed in section 5.1. Two ways are commonly used to deal with this issue. The first one is to estimate the model with time dummies included. However this solution can only be applied to the estimation of the error correction model and not of the co-integration relationship. Thus, we include a time dummy for the post-second war years when estimating the short-term interactions. The second solution is to re-estimate the models for subsamples. For this purpose, we split our whole period into two sub-periods, 1896-1938 and 1947-2008 and re-estimate both the co-integration relationship and the error correction models.

2.3.3 GRANGER CAUSALITY

The identification issue, which consists of identifying the sense of the causality, lies at the heart of the literature on the relationship between government size and economic output. Although it is supposed to be especially the case of cross-section analyses because of "pooled estimates of the effects of government size on economic growth" (Ghali, 1999), the topic is also extensively addressed by time-series analyses. Indeed, a significant coefficient can be interpreted as causality from economic output to government size, according to Wagner's law, which supposes that as a society becomes more developed, the proportion of public spending in total output tends to rise. However, it can be also interpreted as a pure effect from public expenditure to economic activity.

If we find evidence of co-integration, then this implies that there must be Granger causality from the independent variables of our model to real GDP, or *vice versa*, or both ways. To capture the short-term interactions, we employ a multivariate Granger causality approach taking into account the error correction term in case of co-integration. Indeed, the standard Granger causality tests are misspecified in such a case (Engle and Granger, 1987).

2.4 RESULTS

2.4.1 DATA AND VARIABLES' DEFINITION

In the following, we use annual data on France covering one of the longest democratic periods, from 1896 to 2008. However, data on government size are not available for two periods, 1914–1919 and 1939–1946, which correspond approximately to the war periods and

the non-democratic Vichy Regime. Deleting missing observations and interpolating across the gap are two common options. As the second option ranks the last in terms of size distortion and power (Ryan and Giles, 1998), we opt for the first choice and thus exclude these two sub-periods from our sample period. All the variables are considered in natural logarithms so that their first differences approximate their growth rate. The dependent variable, the annual real GDP in 1990 constant dollars (*Y*), comes from Maddison's website.[10] Our main independent variable is the size of the government (*G*), expressed by the total public expenditure (central state, social protection and local public authorities) as a percentage of the total GDP. To build this variable, we follow Florio and Colautti (2005) and use the historical data of André and Delorme (1983), covering the period 1896-1974 but excluding the war periods 1914-1919 and 1939-1946. We connect it with the official data of the National Institute of Statistics and Economic Studies, which provides data on total government size from 1959 to the end of our period.

For the rest of our model, the degree of economy openness (*O*) is approximated by the share of the external trade (exportation + importation) as a percentage of the total GDP, the data coming mainly from Asselain and Blancheton (2005). The data on total population (*P*) come from Maddison's website.[11] The variable measuring taxation (*T*), available on Piketty's website,[12] corresponds to an aggregate tax rate as a percentage of national income. The description and sources of the variables are given in Table 2.3.

The evolution of our main variables, real gross domestic product and government size, is presented in Fig. 2.2. At first glance, when we look at the big picture over the whole century, both variables have steadily increased, thus suggesting a potential common trend. Both variables also seem to have been deeply marked, especially by the Second World War. While the GDP was rather stable until the Second World War, it has sharply and continuously increased afterwards. Regarding government size, it was widely boosted by the First World War but decreased immediately afterwards. However, the Second World War has had a long-lasting effect, called Peacock and Wiseman effect since, after 1945, government spending did not return to pre-war levels. Consequently, even though both variables may have a common trend in the pre-Second World War period, this does not seem to be any longer the case

[10]Maddison's website (http://www.ggdc.net/MADDISON/oriindex.htm): Historical Statistics of the World Economy: 1-2008 AD- Table 2: GDP levels-France GDP in million 1990 International Geary-Khamis dollars.
[11]Maddison's website (http://www.ggdc.net/MADDISON/oriindex.htm): Historical Statistics of the World Economy: 1-2008 AD- Table 1.
[12]Piketty's website: http://piketty.pse.ens.fr/fichiers/public/Grasset2001/Livre/TabChap1.xls

afterwards. Indeed, government size has had a slower growing trend than real GDP. This could suggest that their long-term co-integration relationship is not monotonic.

Table 2.3
Data description and sources

Variable	Obs.	Mean	Std Dev.	Min.	Max.	Source
real GDP	113	405380	404230	71666	1423562	Maddison's website. Historical Statistics of the World Economy, Table 2
government size	99	31,2	15,12	10,6	54,92	Andre and Delorme (1987) National Institute of Statistics and Economic Studies
openness	113	28,83	8,68	5,93	47,01	Asselain and Blancheton (2005) World Bank
population	113	46159	8066	37679	64058	Maddison's website. Historical Statistics of the World Economy, Table 1
taxation	113	0,281	0,153	0,062	0,501	Piketty's website
dummy post WWII	113	0,566	0,5	0	1	-

Notes: Definitions: real GDP = annual gross domestic product in million 1990 international Geary-Khamis dollars; government size = percentage of total public spending (central state, social protection and local public authorities) in total GDP; openness = percentage of the sum of importations and exportations in total GDP; population = total population size; taxation = aggregate tax rate as a percentage of national income; dummy post WWII = dummy variable coded 0 before 1945 and 1 afterwards.

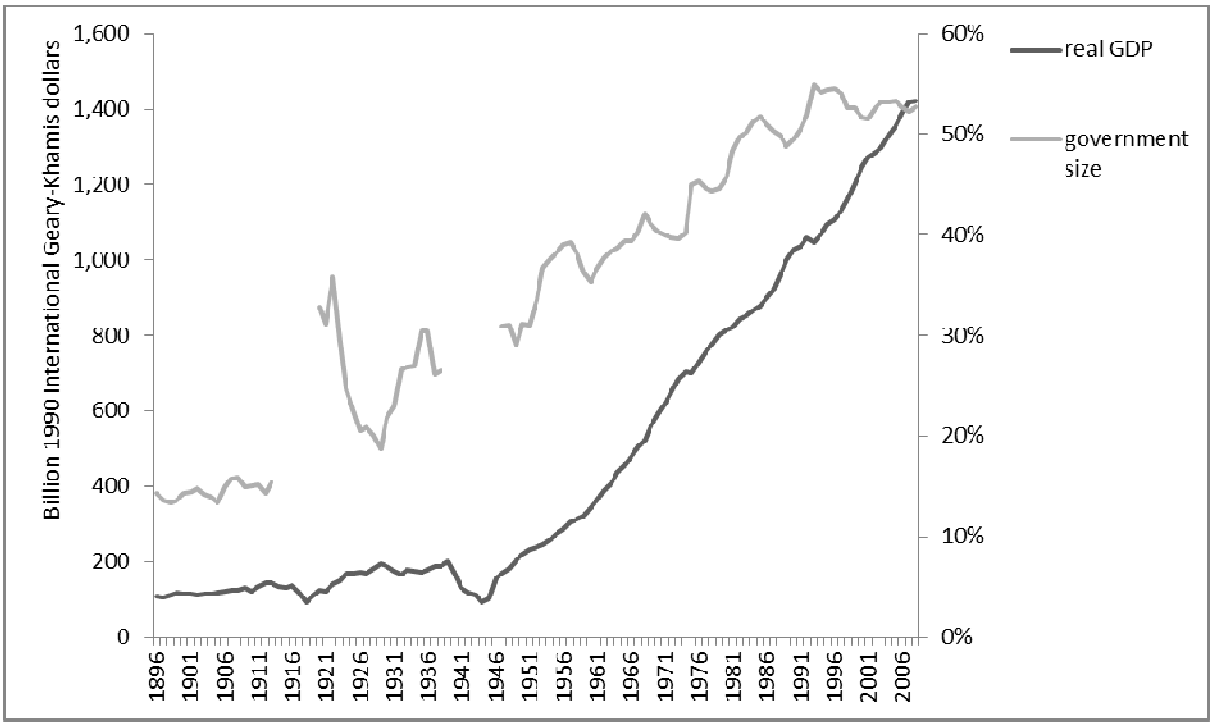

Fig. 2.2
Evolution of the French real GDP and government size (total public expenditure as a percentage of GDP)

2.4.2 TEST RESULTS FOR UNIT ROOT TESTS

As a prerequisite for later analysis, we first examine the time-series properties of the data series, using the augmented Dickey–Fuller (ADF), the Phillips–Perron (PP), the Generalized Least Squares Dickey-Fuller (DF-GLS), Kwiatkowski, Phillips, Schmidt and Shin (KPSS) and the Elliot, Rothenberg and Stock point optimal (ERS) tests. Table 2.4 presents the test statistics for the log levels of the series. For real GDP, population and taxation, the five tests unambiguously show that null of unit root cannot be rejected at the 5% statistical level or that the null of stationarity can be rejected at the 5% level in the case of the KPSS test. Concerning government size and openness, only one test (respectively ERS and KPSS) provides evidence of stationarity while the others make a strong case of a unit root. The tests on the first difference of the variables are provided in Table 2.5 and show that the first difference of the variables are stationary, thus supporting the hypothesis that all variables are integrated of order one, or I(1).

Table 2.4
Unit root tests on the log-levels of the variables

Variable	Deterministic component	ADF	PP	DF-GLS	KPSS	ERS
real GDP	constant, trend	-2,474	-1,883	-2,032	0.647***	10.968
government size	constant, trend	-3.091	-3.215*	-2.489*	0.179**	4.843***
openness	constant	-1.704	-1.947	-1.734*	0.250	3.555*
population	constant, trend	-1.210	-0.973	-1.032	0.335***	33.763
taxation	constant	-1.744	-1.803	-1.770	0.193**	13.184

Notes: (1) The tests are performed on the log-levels of the variables. (2) ADF, PP, DF-GLS, KPSS, ERS refers respectively to the Augmented Dickey-Fuller test, the Phillips-Perron test, the Generalized Least Squares Dickey-Fuller test, the Kwiatkowski, Phillips, Schmidt and Shin test and the Elliot, Rothenberg and Stock point optimal test. (3) When it is required, the lag length is chosen according to the Schwarz information criterion. (4) * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 2.5
Unit root tests on the first log-differences of the variables

Variable	Deterministic component	ADF	PP	DF-GLS	KPSS	ERS
real GDP	constant	-5.070***	-9.102***	-3.338***	0.143	1.613***
government size	constant	-8.326***	-8.340***	-3.518***	0.081	1.145***
openness	constant	-11.603***	-11.741***	-11.645***	0.107	0.175***
population	constant	-4.989***	-4.980***	-4.344***	0.409	1.000***
taxation	constant	-8.421***	-8.607***	-4.496***	0.104	0.739***

Notes: (1) The tests are performed on the first log-differences of the variables. (2) ADF, PP, DF-GLS, KPSS, ERS refers respectively to the Augmented Dickey-Fuller test, the Phillips-Perron test, the Generalized Least Squares Dickey-Fuller test, the Kwiatkowski, Phillips, Schmidt and Shin test and the Elliot, Rothenberg and Stock point optimal test. (3) When it is required, the lag length is chosen according to the Schwarz information criterion. (4) * significant at 10%; ** significant at 5%; *** significant at 1%.

However as noted by Perron (1989), in the presence of structural breaks in our series, unit root tests can lead to a misleading conclusion that there is a unit root when in fact there is not. To address this issue, we run additional unit root tests allowing for structural breaks. We first run a test proposed by Perron (1989) in which the break is exogenous. To identify potential breaks in our series, we follow Perron who focuses on the effect of the Great Depression of 1929 and of the first oil shock of 1973 with U.S. data. In addition, an analysis of the secular evolution of our series reveals that the years 1918, 1929, 1944 and 1974 often corresponds to breaks in our series (1918, 1944 and 1974 for real GDP; WW1, 1929, WW2 for government size; 1944 for openness; 1918, 1944, 1974 for population; 1918, 1944, 1974 for taxation). Therefore, we perform the Perron test on each of our variables except *G* (government size) because of problems of discontinuity of the series and we take sequentially each of the four dates as an exogenous break. Among the three models proposed by Perron, we chose the “changing growth model” or type "B" model that is more adapted to our series. Table 3.6 shows the results of this test. Whatever date is considered as a break, the test does not reject the null of the unit root.

Table 2.6
Perron (1989) unit root test on the log-levels of the variables

T_b	1918 (λ=0.35)	1944 (λ=0.54)	1929 (λ=0.43)	1974 (λ=0.75)
real GDP	-3.001	-3.617	-3.496	-2.709
openness	-2.179	-2.393	-2.437	-2.523
population	-2.353	-3.236	-3.067	-1.900
taxation	-1.834	-2.893	-2.424	-3.119

Notes: (1) For λ=0.3 the 5% critical value is -3.87; for λ=0.5 the 5% critical value is -3.96; for λ=0.4 the 5% critical value is -3.94; for λ=0.7 the 5% critical value is -3.85; (2) estimation of the "changing growth model" or type "B" model proposed by Perron (1989). (3) * significant at 10%; ** significant at 5%; *** significant at 1%.

Because Perron (1989) requires the strong hypothesis that we know a priori the date of the break, we also run the Zivot and Andrews (1992) unit root test with an endogeneous structural break either in the intercept (column a) or in the trend (column b).[13] As shown in Table 2.7, this test can never reject at the 5% significance level the null of unit root[14]. Therefore, we can reasonably assume that all our variables are I(1).

Table 2.7
Zivot-Andrews unit root test on the log-levels of the variables

	(a)			(b)		
Variable	T_b	t_{min}	k	T_b	t_{min}	k
real GDP	1960	-3.904	3	1942	-3.749	3
government size	1913	-4.894**	2	1984	-3.822	2
openness	1930	-3.873	3	1942	-3.518	3
population	1915	-2.964	2	1941	-3.671	2
taxation	1919	-4.064	2	1959	-3.498	2

Notes: (1) (a) refers to the model allowing for break in intercept and (b) the model allowing for break in trend; (2) T_b is the break date endogenously selected. (3) t_{min} is the minimum t-statistic. (4) k denotes the lag length. (5) * significant at 10%; ** significant at 5%; *** significant at 1%.

[13] We cannot run this test on our original variable of government size, *G*, because of the missing observations during the war periods. However, we propose to show the Zivot-Andrews test on a series of government size that we construct by interpolating the gaps during the two war periods.

[14] For *G*, government size, the test rejects at the 5% significance level the null of unit root for one of the two models, i.e. the model estimating a break in the intercept. However, the test cannot reject the null of unit root at 1% and the date of the break occurs in 1913, during a period for which we artificially created data to fill the gap of the series. Linearly interpolating the series artificially introduces a regime change in our series and may lead to unreliable conclusions of the Zivot-Andrews test for this variable.

2.4.3 TEST RESULTS FOR CO-INTEGRATION

All the variables being integrated of the same order, they satisfy the requirements for the possible existence of a co-integration relationship among them. As recommended by Engle and Granger (1987), the co-integration model is estimating using an OLS procedure with the variables in level. The results are shown in Table 2.8. In column (1a), we estimate for the whole period the first specification (1) of our model, i.e. a monotonic relationship between *Y* and *G* along with the set of control variables. An ADF test is run on the error terms produced in order to test for co-integration. The values of the ADF tests are reported in the last row of Table 2.8. The absolute value of the test statistic being above the critical value of the 5% level of significance, suggested by Engle and Granger (1987: 269), the null of no co-integration can be rejected. Therefore, this regression shows significant co-integration between the variables of our model and thus between real GDP and government size. This regression gives also an estimated long-term multiplier of public expenditure of 0.12, much lower than 1, thus in contradiction with the Keynesian prediction.

Table 2.8
Co-integration relationship

	real GDP (1896-2008)		real GDP (1896-1938)		real GDP (1947-2008)	
	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)
constant	-25.373*** [23.373]	-34.769*** [16.320]	-54.906*** [5.339]	-53.219*** [4.765]	-31.918*** [18.107]	-41.366*** [20.688]
government size	0.120*** [3.185]	2.010*** [5.250]	0.222*** [3.682]	1.008 [0.538]	-0.021 [0.187]	5.560*** [6.351]
government size²	-	-0.296*** [4.955]	-	-0.127 [0.419]	-	-0.743*** [6.408]
openness	0.212*** [7.239]	0.200*** [7.585]	0.380*** [6.693]	0.351*** [3.954]	0.118*** [2.816]	0.185*** [5.455]
population	3.486*** [34.195]	4.082*** [27.060]	6.171*** [6.572]	5.904*** [5.156]	4.151*** [26.316]	4.035*** [33.014]
taxation	0.397*** [11.159]	0.325*** [9.300]	0.322*** [4.991]	0.298*** [3.441]	0.217 [1.484]	0.175 [1.565]
Adj. R2	0.996	0.997	0.912	0.910	0.997	0.998
ADF	-4.486**	-5.326***	-4.848***	-4.153*	-1.832	-2.796

Notes: (1) t-statistics in brackets in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (2) ADF: in the last row of the table, we report the statistics of the ADF test on the error terms of the regression. The critical values are the ones tabulated by Engle and Granger (1987: 269).

Then, we estimate for the whole period the second specification of our model allowing a nonmonotonic relationship between *Y* and *G* (column 2a). The ADF test on the residuals of the regression provides even stronger evidence of co-integration than for the monotonic model since we reject, in the nonlinear case, the null of no co-integration at the 1% significance level against 5% for the linear model. Moreover, we notice that *G*, government size, has a positive coefficient while G^2, the squared term, emerges as having a negative one. This provides evidence of a nonmonotonic, inverted U relationship between government size and real GDP in the long run. The coefficients of *G* and G^2 also allow us to determine that the government size that maximizes the output was reached when the total public expenditure represented around 30% of GDP.

However the estimations for the sub-periods 1896-1938 and 1947-2008 provide mixed evidence of co-integration. For 1896-1938, the estimation of the linear model produces error terms that are stationary at 5%, as shown in column (3a). Thus, this estimation provides evidence of co-integration, giving a long-term multiplier of public expenditure of 0.22, almost twice higher than for the whole period, but still inferior to 1. When estimating the nonlinear model for this sub-period (column 4a), the null of no co-integration can only be rejected at 10%. In additions to weak evidence of co-integration for this period, the coefficients of *G* and G^2 are respectively positive and negative but do not reach any reasonable level of significance. This suggests that a long-term nonlinear relationship is not supported for this sub-period. For 1947-2008, neither the monotonic nor the nonmonotonic models show evidence of co-integration (columns 5a and 6a). While the signs of the coefficients of *G* and G^2 still suggest an inverted U relationship, they cannot be interpreted in the absence of co-integration.

However, the fact that the nonlinear co-integration relationship between output and government size does not hold when splitting the whole period, is not in contradiction with the existence of such a relationship for the whole period. Indeed, a nonmonotonic relationship between two variables can only be observed in the presence of a structural break in the relationship between the variables, which implies a break in the trend of at least one of the two variables. However, as noted above, a structural break (after the Second World War) can be only observed over the whole century, but not when considering sub-periods. For each sub-period, both variables seem to follow a stable trend, which turns out to be common for the pre-Second World War period.

2.4.4 TEST RESULTS FOR ERROR CORRECTION MODEL AND GRANGER-CAUSALITY

For short-run dynamics, we estimate the error correction models using the error terms of the co-integration regressions. As indicated by the Schwarz criterion, the estimated model includes one lag, which allows us to interpret the sign and the magnitude of the estimated coefficients, which is not the case when the lag length is bigger. Before any interpretation of the coefficients, t-tests require normality of the error terms. Thus, for each regression, we control for potential outliers and apply a Jarque–Bera test to check for the normality of the residuals. A Box–Pierce test is also performed to make sure of the absence of serious auto-correlation of the error terms.

Table 2.9
Error correction model

	Δ(real GDP$_t$) (1896-2008)		Δ(real GDP$_t$) (1896-1938)		Δ(real GDP$_t$) (1947-2008)	
	(1b)	(2b)	(3b)	(4b)	(5b)	(6b)
constant	0.005 [0.687]	0.007 [0.985]	0.012 [0.949]	0.018* [1.911]	0.007** [2.389]	0.008** [2.560]
Δ(government size$_{t-1}$)	-0.136 [1.578]	0.293** [2.402]	-0.265** [2.514]	0.039 [0.273]	0.128* [1.801]	0.354** [2.337]
Δ(government size$_{t-1}$)^2	-	-0.087*** [4.587]	-	-0.096*** [3.099]	-	-0.064*** [-3.799]
Δ(openness$_{t-1}$)	-0.113* [1.898]	-0.007 [0.137]	-0.209* [1.911]	-0.225* [1.886]	-0.084** [2.515]	-0.050** [2.455]
Δ(population$_{t-1}$)	1.270 [1.181]	1.113 [1.116]	-1.419 [0.326]	-2.967 [0.930]	-0.180 [0.338]	-0.015 [0.019]
Δ(taxation$_{t-1}$)	0.120 [0.983]	0.039 [0.418]	0.051 [0.252]	0.098 [0.590]	-0.021 [0.338]	0.100 [1.034]
Δ(real GDP$_{t-1}$)	0.367** [2.441]	0.201 [1.136]	0.388** [2.080]	0.178 [1.159]	0.777*** [7.232]	0.739*** [4.992]
error correction term$_{t-1}$	-0.284*** [3.198]	-0.217** [2.129]	-0.531** [2.280]	-0.451** [2.210]	0.003 [0.063]	-0.071 [0.914]
dummy post WWII	0.008 [0.895]	0.015* [1.710]	-	-	-	-
Adj. R^2	0.227	0.448	0.174	0.350	0.739	0.706
Jarque-Bera	0.240	0.505	0.732	0.876	0.223	0.154

Notes: (1) White-corrected t-statistics in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (2) For each regression, we control for the outliers. (3) Jarque-Bera reports the p-value of the Jarque-Bera test on the residuals of the regression.

The estimations of the error correction models for the whole period and the sub-periods 1896-1938 and 1947-2008 are provided in Table 2.9. The coefficients of the lagged error correction terms confirm our previous findings regarding evidence of co-integration on the whole sample and mixed evidence when splitting the period. Indeed, with both the linear and nonlinear equations, the coefficient of the error correction term is statistically significant and negative for the whole period as well as for 1896-1938. However, although the error correction term is negative for the nonlinear post-war regression, it does not reach any reasonable level of significance. The different magnitude of the coefficients of the error correction terms according to the different time periods also suggests that the speed of adjustment during the pre-war period was more than twice as high as in the whole of the 20th century. More generally, these coefficients refer to quite a high speed of adjustment in our growth model, one-fifth of the divergence from the equilibrium state being corrected each year for the whole period.

Concerning the other variables, regardless of the time period and the model, an increase in population and taxation do not seem to have any short run effect on economic growth. However a variation in economic openness has a consistently negative, statistically significant effect on growth. Concerning our main variable of interest, we notice no linear effect of government size in the whole (column 1b, Table 2.9) period but contrasting effects of the variable before and after the Second World War[15] (columns 3b and 5b). However in the whole period and both sub-periods, the estimation of the nonmonotonic model provides strong evidence of the inverted U effect of an increase in government size on economic growth (columns 4b and 6b).

The error correction model supplies us with a first indication concerning the Granger-causality between our variables. While openness and government size Granger-cause real GDP, the estimation of the error correction model does not provide evidence of Granger-causality from population and taxation to GDP. To investigate all the possible causal effects between the variables of our model, we conduct, for the whole period, a Granger-causality test based on a VAR including all the variables of our model. The test results, reported in Table

[15] However we must be careful about these signs because they can vary when increasing the lag length.

2.10, show a unidirectional causality from Δ(government size) to Δ(real GDP), approximating GDP growth. This unique causality pattern contradicts the Wagner law. The results also suggest a linkage running from the Δ(openness) to economic growth but not in the reverse direction. These causal relationships hold for the sub-periods and are also in line with the evidence provided by Ghali (1998) for France for 1970-1994[16]. Our results are also in accordance with other studies in long periods, such as Yuk (2005), which provides empirical support for the same causality in the United Kingdom for the period 1830–1993[17].

Table 2.10
Multivariate Granger-causality test

	Δ(real GDP)	Δ(government size)	Δ(government size)²	Δ(openness)	Δ(population)	Δ(taxation)
Δ(real GDP)	-	0.436	0.400	2.791	17.138***	8.310**
Δ(government size)	11.002***	-	3.276	1.335	0.773	4.419
Δ(government size)²	11.577***	4.100	-	1.102	0.779	3.892
Δ(openness)	3.514	3.294	3.428	-	5.625*	0.878
Δ(population)	0.171	2.454	2.545	8.271**	-	4.792*
Δ(taxation)	4.351	18.489***	18.673***	0.529	2.410	-
All	19.082**	37.889***	38.922***	13.574	29.848***	19.739**

Notes: (1) Granger F-Tests are reported. (2) Null hypothesis: the variable in the first column do not Granger-cause the variable in the first row. (3) * significant at 10%; ** significant at 5%; *** significant at 1%. (4) "All" denotes the Wald statistic for the joint significance of all lagged endogenous variables (excluding lags of the dependent variable).

2.5. DISCUSSION

2.5.1 METHODOLOGICAL DIVERGENCES IN THE LITERATURE

Rather than merely supplying yet more evidence of the nonlinearity hypothesis for an additional country or period, it is interesting to determine whether our result is consistent with the related empirical literature. The aim is actually to understand, in the light of our finding,

[16] Ghali (1998) runs Granger-causality tests based on a VAR including GDP, the share of investment in GDP, the share of total public expenditure in GDP and the share of imports and exports in GDP. He finds evidence of the "trade-led growth" and the "public expenditure-led growth" hypotheses for the French case.
[17] Yuk (2005) estimates a VAR model including GDP, the share of investment in GDP, the share of total public expenditure in GDP and the share of exports in GDP. He finds strong evidence of causality from government size to output, but mixed evidence for the Wagner law according to the observation periods. The "export-led growth" hypothesis is also supported.

the diversity of the sometimes contradictory results of the studies on the relationship between government size and economic performance. We can first notice that our finding of a 30% output-maximizing ratio is oddly significantly higher than the usual 20% ratio found in the studies on the US. That leads us to wonder whether these differences are due to a methodological bias or at least methodological divergences among the studies or rather to French or European originality.

The first possibility is that the optimal point of government size is underestimated in the studies on the US because of observations periods that are too short and do not contain many observations with a government size below the optimal one found. Indeed, by starting the study after the 1930s, i.e. after the occurrence of the optimal point, as is the case for Vedder and Gallaway (1998), who started their study in 1947, or only a few years before, in 1929, as is the case for Grossman (1987), Peden (1991) and Scully (1994), not enough observations before the optimal size are taken into account. Mueller (2003: 546) already underlined that "some caution must be exercised in accepting Peden's [*and others'*] estimate of optimal government size, given the very few observations [they] had when the government was smaller than 17 % of national income". By contrast, in our study, the government size is systematically under its optimal size until at least the end of the First World War. That gives serious grounds for thinking that the optimal size that we determined is reliable and does not suffer from this bias of small sample.

However, a second possibility is that a diversity of optimal government sizes does exist according to the countries considered or more generally the institutional patterns. Indeed, while the studies on the US, whether biased or not, tend to reach a consensus on a low optimal size, the studies on other countries, with similar biases, tend to converge towards much higher sizes. Our finding is in fact consistent with the studies on different panels of countries (Tanzi and Schuknecht, 1996; Chao and Gruber, 1998; Afonso et al., 2003; Davies, 2009) and especially on the EU countries whose optimal size would be between 37% (Forte and Magazzino, 2011)[18] and around 40% (Pevcin, 2004)[19]. Therefore, it does appear that a relatively high optimal government size would be a Europe-specific feature compared with the US and does not result only from different observation periods.

[18] Forte and Magazzino (2011) find a 37% average optimal state size for Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and the UK.
[19] Pevcin (2004) finds a 36–43% optimal government size for eight EU countries: Italy, France, Finland, Sweden, Germany, Ireland, the Netherlands, and Belgium.

However, our result of a 30 % ratio also contrasts with the above 40% ratio of the other studies on France (Forte and Magazzino, 2011; Pevcin, 2004). Nevertheless, in this case too, this divergence undoubtedly stems from the shorter observation periods of these studies. Indeed, Forte and Magazzino (2011) start their analysis in 1970, that is to say around 20 years after the occurrence of the optimal size that we determined. Pevcin (2004) starts its analysis in 1950, thus including very few observations with a government size below 30%. With our long time-series analysis, we can be reasonably confident about a 30% optimal size for the French government. It turns out that the shorter the observation period, the more the optimal point is sensible to the inclusion or exclusion of observations. This is, for instance, the case in the study of Mavrov (2007: 58), who estimates that the optimal size for the Bulgarian State is 21% in the very short period from 1990 to 2004.[20]

2.5.2 RESULTS' CONVERGENCE IN THE LITERATURE

In spite of the potential biases inherent in the various observation periods, the convergence of the empirical findings on different optimal government sizes according to the country studied tends to invalidate the thesis of a single inverted U-shaped relationship between government size and output for all countries. The stakes are now to establish the determinants of the optimal government size. The first intuition was that the variety of government effects and optimal sizes was probably due to "different political environments, different spending histories, and different patterns of change in non-observable variables, such as the pace and pattern of innovation" (Vedder and Gallaway, 1998; Mueller, 2003: 549). However, the literature also provides observable factors such as the level of economic development (Mueller, 2003: 549; Forte and Magazzino, 2011) and more particularly prerequisites in terms of literacy and education, political institutions (political instability, distortionary regulation) and cultural environments (Barro, 1990). In one of the latest advancements on the topic, Forte and Magazzino (2011) investigate two potential determinants that could be the national tradition of the welfare state and the flexibility of the labour market. However, the most important determinant of the shape of the inverted U curve seems to remain the national economic development. As proof, in a seminal study on 115 "market economies" in the

[20] Mavrov (2007: 59): "For example, 2 years smaller period increase optimal size to 22.5% and 3 years – to 25%. The same result is possible under increasing the period."

period 1960–1980, Ram (1986: 191) finds an overall positive effect of government size on economic outcome, but a closer look reveals that this effect does not empirically hold for the 8 most developed countries of his panel[21].

The fact remains, however, that a better understanding of the optimal government size and its determinants allows us to ensure (a little) consistency among the numerous and contradictory studies on the effect of public expenditure on economic activity. The existence of an inverted U curve that would be peculiar to each country enables us to understand why the empirical findings depend greatly on both the observation period and the countries studied. The period is decisive because, by focusing on a rather short one, the huge majority of the studies focus either on the rising or the declining portion of the curve, most often on the declining one since they study recent periods. Incidentally, they can account for a global negative effect with a linear model. However, the studies often omit to specify that the effect they find is valid only for a narrow specific size of government, contrary to Peden and Bradley (1989: 242), who specify that "the negative relationship between government scale and productivity that [they] find is relevant for current ratios of government spending (about 35%) […and] not inconsistent with the argument that there may be an 'optimal' size of government". The panel studied is at least as decisive because, in view of the literature, the effect of the government size seems to depend deeply on economic, cultural and political institutions. Under these conditions, it turns out to be very informative to perform long time-series analyses for single countries.

2.6 CONCLUSION

The objective of this study was to investigate the relationship between government size and economic output both theoretically and empirically. Its theoretical originality was to decompose the nonlinear curve of the total effect of government activity into two curves representing the costs of the state failures and the benefits from correcting market failures. It enabled us to unify in a single theoretical framework two sets of theories that are generally in competition or that at best disregard each other.

The main empirical contribution of this paper was to provide evidence of the existence of an inverted U-shaped relationship between government size and output using time-series data

[21] When focusing on the time-series analyses for France, Italy, Austria, Australia, Germany, Portugal, the UK and the USA, we realize that government size either does not play any role or has a negative influence.

on France in the 20th century. The main empirical findings are as follows. (1) We demonstrated the existence of a long-run co-integration relationship between real GDP, government size, total population, economy openness and taxation for the period 1896-2008 with both a monotonic and a nonmonotonic model. However the co-integration relationship received mixed evidence for the sub-periods 1896-1938 and 1947-2008. (2) The linear co-integration relationship gave an estimated long-term multiplier of public expenditure of 0.12, against the Keynesian prediction. (3) The nonmonotonic relationship provided even stronger evidence of co-integration for the whole period. (4) It supplied evidence of an inverted U-shaped relationship with an optimal government size of 30% of the total GDP. (5) The nonlinear effect of government size could also be observed when estimating the short-term dynamics between the variables.

We can draw some lessons from this result. First, the size that maximizes output has been continuously exceeded in France since the 1950s. Therefore, our empirical finding provides us with good reasons to believe that the government size in 2008 was higher by around 20% than the output-maximizing size. Like most other industrialized nations, France is currently on the downward-sloping portion of its inverted U-shaped curve. If France had kept a government size close to the ratio of 30%, it would have experienced on average for the period 2000–2008 an annual growth rate of 3.23% instead of the 1.93% actual rate, a significant loss of 1.9% per year.

Another implication of theoretical framework as well as our findings is support for the thesis of the diversity of the optimal government sizes according to country and institutional pattern. Indeed, the French optimal size of 30% contrasts with the 20% figure found in the studies on the optimal size of the US government. However, it is rather in accordance with the literature on other countries and especially countries within Europe. Our theoretical framework allows us to explain the diversity of the national optimal government sizes and more generally of the different efficiencies of governments. These differences result from the difference between the benefits from the governments' ability to correct market failures and the costs inherent in state failures.

3. THE DETERMINANTS OF THE STATE SIZE IN THE 20TH CENTURY: EVIDENCE FROM THE OLDEST DEMOCRACIES[1]

3.1 INTRODUCTION

Over the last century, the total government spending as a fraction of GDP, also called the government size, has experienced very similar episodes of increase in the industrialized countries. The average total government spending in these countries represented around 10% of GDP in the late 19th century and around 45% in 1996[2] (Tanzi and Schuknecht, 2000). However, this common feature conceals historical disparities among the countries. For instance, the government size of 7.3% in the United States in the 1870s was around half as high as in Italy and France (Tanzi and Schuknecht, 2000). Such disparities have persisted. Indeed, by the late 1990s, the government size was around 35% in the U.S. and above 50% in many countries of continental Europe (Persson and Tabellini, 2003). While the literature provides general explanations of the growth of government size, we do not know if the determinants of government size vary between countries and over time.

In this paper, we ask whether the long-run determinants of government size differ according to the periods and the countries. As one the main causes of the growth of government size is attributed to the Baumol's cost disease, we focus here on this explanation. Based on Facchini, Melki and Pickering (2012a)[3], we argue theoretically that the Baumol's theory implies that the size of government is increasing in the labor share and that this impact

[1] This essay is based on Facchini, Melki and Pickering (2012a, 2012b).
[2] Maddison (1989) provides very close figures for a similar set of industrialized countries. He estimates that the average fraction of total government spending was 11.7% in 1913 and around 46% in 1986. (Maddison, 1989, p. 71).
[3] The theoretical model is developed in Facchini, Melki and Pickering (2012) with a test on OECD data.

increases as political ideology moves left and as income rises. We provide a test of our theoretical predictions by controlling for most theories explaining the growth of government size. For that, we use original time-series data on three democratic countries all over the 20th century, i.e. the United-States, the United Kingdom and France. By proposing a dynamic model of the growth of government, we allow the determinants of government size to have evolved through time and according to a society's ideology regarding the suitable level of government intervention in the economy. We find evidence that the determinants of government size mostly vary between countries and over time. Concerning our theoretical predictions related to the Baumol's cost disease, we find a strong support especially for the France and the U.K. for the post-second-world-war period. However, our predictions do not receive support for the U.S. case.

The growth of government size has traditionally received numerous theoretical explanations. The diversity of explanations is reflected in the empirical studies that do not provide aggregation and hierarchy of the different explanations. Indeed, one the one hand, the cross-section studies are unable in nature to tackle the issue of the diversity of the determinants of government sizes, emphasizing only the most general determinants. On the other hand, the time-series studies on the topic mostly focus on one country and on rather short observation periods. Moreover, the fact that the existing time-series studies differ in their methodologies often avoid a comparison between their findings. This leaves unanswered the question of the varying determinants of government size.

The Wagner's law, based on the citizens' demand for government goods, probably focused the major part of the attention of the empirical literature. Peacock and Scott (2000) provide a critical review of this strand of the literature. In addition to emphasize the quantity and diversity of the works, Peacock and Scott conclude that this empirical literature fails to provide support for the Wagner's law.[4] Among the numerous studies on the Wagner law and more generally on the determinants of the growth size, only Ram (1997) provided a time-series analysis of government size for different countries, for the period 1950-1980. However, the model he estimates includes only income as an independent variable, thus providing no information on the other possible determinants of government size. Even when focusing on a single determinant, he found a tremendous diversity in the evidence for various countries,

[4] Focusing on studies of the U.S. government size, Holsey and Borcherding (1997) already concluded that the Wagner's law was not empirically founded. Concerning other long time-series analyses, Henrekson (1993) did not find evidence of the Wagner's law in Sweden for the period 1861-1990. Studying the period 1821-1969, Aubin et al. (1988) showed that the Wagner's law cannot be validated with French data.

suggesting the diversity of the national determinants. Like Ram (1987), we propose a time-series analysis on different countries but we go further in the study of the diversity of the national determinants. Indeed, we augment his econometric model with a comprehensive set of independent variables and we significantly extend the observation period.

On the supply side, Baumol's (1967) cost disease explains the increasing share of the public sector expenditure by the increasing wage in the public sector. Indeed, the absence of technological progress in the public sector combined with the price-inelasticity of the demand for government goods entails a rise in the public wages. The Baumol's hypothesis received quite solid empirical evidence in the literature[5]. The studies testing the Baumol's hypothesis have in common to use the difference between the private goods and services price deflator and the government's implicit price deflator as a proxy for the cost disease. However, Facchini, Melki and Pickering (2012a) show the limits of such a measure. As a consequence, we propose here another methodology, based on an extension of the model of Baumol (1967). Using cross-sectional data from the OECD, Facchini, Melki and Pickering (2012a) provide strong empirical support for the model presented here. However, their estimation is restricted to the post-1970s period due to the limited availability of labor-share data for the OECD panel. In the present paper, we test the model over much longer time horizons in a smaller sample of countries for which labor share data are available. Investigating the cost disease hypothesis at the scale of a century enables us to date when the phenomenon of cost disease started in the different countries of our sample.

In this paper, we also revisit other traditional explanations of the growth of government size, which received mixed evidence in the empirical literature. Based on an interest groups model, a seminal explanation is provided by Meltzer and Richard (1981) who limit the government to a redistributive role according to the voters' distinct positions in terms of incomes[6]. Meltzer and Richards (1983) document a positive impact of incomes inequality on government size with American data but which has not been solid when confronted with

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[5] Augmenting the empirical analysis of Ram (1987) with data for relative prices, Gemmell (1990) provided evidence for the cost disease and against the Wagner's law. Holsey and Borcherding (1997) review the time-series studies on the U.S. and conclude that there exists a strong support for increased input prices in the face of price inelastic demand as a determinant of the government size. This conclusion was confirmed, often at the expense by the Wagner's law, by most recent studies (Ferris and West, 1996; Borcherding et al., 2004; Neck and Gertzner, 2007).

[6] Holsey and Borcherding (1997) qualify the explanations pertaining to the demand and supply of public services as the apolitical explanations. They can be distinguished from the political ones that question the view that government is the benevolent servant of the people. A distinctive feature of the political explanations is that they are based on the coalition or the interest groups models rather than the median voter model of the apolitical explanations (Holsey and Borcherding, 1997, p. 575).

additional empirical investigation (Pickering and Rockey, 2011). The Meltzer and Richard's (1981) model might suffer from an omitted variable bias. That tends to be supported by Boix (2001) arguing that, given higher abstention rates among the lowest income groups, the effect of income inequality on government size depends on the abstention rate. Similarly, the apolitical explanation of Rodrik (1998) by the economy openness does not seem to hold when taking into account the nature of the electoral system, as shown by Milesi-Ferretti at al. (2002).

Most of the theoretical explanations of the government size are static, thus suggesting that the empirical determinants of the government size have not evolved through time. However, among the latest developments on the Wagner's law, Florio and Colautti (2005) provide a dynamic model showing that increasing incomes can drive the increase in the growth rate of public spending to a certain point where the burden of taxation reverses the process. They provide empirical evidence of this dynamic process over the last century for the U.S., the U.K., France, Germany and Italy. However, we argue that the demand-side drivers of the growth of government requires a democratic process of preference revelation. Therefore, we focus our investigation only on democratic countries over the 20th century.

Still in a dynamic context, Pickering et al (2011) show that income elasticity for demand for public spending increases with the leftwing ideology, the latter being defined as the median voter's preference for more government goods. Among the important literature studying the effect of the government's ideology on government size, the time-series analyses comparable to ours provide mixed evidence of a positive impact of leftwing governments. For the United-States, Kau and Rubin (2002) find that the Pool-Rosenthal measure of Senate ideology has a small impact on government revenues. Our time-series provide further investigations of the role of government's ideology on the rise of government size. For that, we use a set of different measures of ideology from basic dummy variables to more sophisticated index taking into account the evolution of the parties' ideology.

The main empirical findings of this paper are as follows. We find that the supply-side explanations of government size received the most solid evidence, especially for the UK and for France for the post-war period. We also provide some evidence showing that the positive effects of costs on the growth of government increase with a left-wing ideology for the whole period and with the economic development after the Second World War. A leftwing ideology has a positive influence on the government size only in France for the post-second-war period. However, most demand-side explanations received no or weak empirical support. Indeed, the

Wagner's law is never supported by our data. We find evidence of a significant effect of the incomes inequality only for the U.K.

The paper proceeds as follows. Section 2 presents the model. The econometric methodology is discussed in section 3. Section 4 presents the data. Section 5 provides the results and some robustness checks. Section 6 concludes.

3.2 THE MODEL: REVISITING THE BAUMOL'S COST DISEASE

Baumol's (1967) cost disease is one of the primary explanations given for the relative growth of the public sector observed in advanced economies since the end of the Second World War[7]. The standard empirical measure of cost disease is the rise in the government consumption deflator relative to the private goods and services price deflator. Theoretically this is well grounded in the Baumol theory. However, in practice this measure is problematical for a number of related reasons. Firstly (all) aggregate price indices suffer from measurement error. In the instance of the private goods and services deflator, Lichtenberg and Griliches (1989) argue that quality change in particular renders intertemporal comparisons of directly observed prices of goods to be of "limited value". The government output deflator is beset by the same problem, and this is exacerbated by the fact that the output of public services is often unpriced (Simpson, 2009).

Whilst measurement error alone would be sufficient reason for wanting an alternative means of testing the Baumol's hypothesis, there is an even more serious problem. In practice the means by which national statistical offices construct the government consumption implicit price index is to use current prices public sector expenditure data divided by their estimate of real (chained volume) output. Measured this way, the implied price index therefore increases and falls with current expenditure. Because the dependent variable is measured as current public sector expenditure divided by current prices GDP, implied price deflator is therefore intimately related (and endogenous) to the dependent variable. When both variables are derived fundamentally from government expenditure data, it is not surprising that a good it is found.

[7] Borcherding (1985) estimates that 31% of the observed growth of total government size in the U.S. between 1902 and 1978 is due to the Baumol effect. Borcherding et al (2004) and similar evidence in a panel of OECD countries.

This paper proposes an alternative. The Baumol model implies that the relative size of government is increasing in the labor's share. In the original model the labor's share represents total costs. Output in the public sector is labor-intensive to the point that labor is output in some instances, so if the labor's share increases then so does government when demand is inelastic. The larger government is, as in regimes that may be classified as leftwing, the greater this effect. Cost-disease follows from Baumol's assumption of constant relative shares of output. Given economic growth (driven by the private sector) resources are inevitably drawn into the public sector. The impact of the labor share on government size is therefore predicted to increase as the economy grows and a larger portion of the workforce is subsumed into the public sector.

In the model proposed here, there are two sectors in the economy. Sector one is the public sector, in which labor productivity is constant. Sector two is the private sector, in which labor productivity grows exogenously. Formally:

$$Y_{1t} = aL_{1t} \tag{1}$$

$$Y_{2t} = bL_{2t}e^{rt} \tag{2}$$

where Y_{1t} and Y_{2t} are respectively output in the public and private sector, L_{1t} and L_{2t} are employment levels in the two sectors, a and b are exogenous parameters, r is exogenous private sector growth and t is a time index. Costs therefore depend only on wages, which following Baumol grow in accord with productivity in the "progressive sector", hence

$$W_t = We^{rt} \tag{3}$$

where W is a constant.

Baumol examines the evolution of an economy in which the relative outputs of the two sectors are maintained, "perhaps with the aid of government subsidy, or if demand for the product in question were sufficiently price inelastic or income elastic." Given (1) and (2) this means that

$$\frac{b}{a}\frac{Y_1}{Y_2} = \frac{L_{1t}}{L_{2t}e^{rt}} = K$$

where *K* is constant and represents society's choice concerning the appropriate level of public output relative to private output. Given these elements,

$$L_{1t} = \frac{LKe^{rt}}{1+Ke^{rt}} \tag{4}$$

$$L_{2t} = \frac{L}{1+Ke^{rt}} \tag{5}$$

where $L = L_1 + L_2$. As Baumol discusses, in this scenario the zero-growth sector absorbs the labor force over time. Equations (1-5) are simply a restatement of the same in Baumol (1967).

The size of the government here is defined by total expenditure on production from that sector relative to total output:

$$g_t = \frac{W_t L_{1t}}{I_t} \tag{6}$$

where following Baumol $I_t \equiv B_1 Y_{1t} + B_2 Y_{1t}$ is total GDP and B_1 and B_2 are weights. On the other hand, the labor share is defined as

$$s_t = \frac{W_t L}{I_t} \tag{7}$$

Substitution of (4) and (7) into (6) gives government size as a function of the labor share

$$g_t = \frac{s_t K e^{rt}}{1 + K e^{rt}}$$

with the following concrete hypotheses:

1. The size of government is increasing in the labor share.

2. The sensitivity of government size to the labor share is increasing with leftist ideology (as proxied in the model by *K*).

3. The sensitivity of government size to the labor share is increasing with economic development (as proxied in the model by time).

However, whilst being necessary conditions of the theory, hypotheses 1 and 2 do not require the key Baumol ingredient of constant relative outputs. Baumol himself contrasts economy performance in an alternative scenario with constant unit elasticity of demand between the two sectors. In this case the relative expenditure on the two outputs is constant, hence as Baumol writes,

$$\frac{W_t L_{1t}}{W_t L_{2t}} = \frac{L_{1t}}{L_{2t}} = A$$

where A is a constant. Here cost-disease is benign; the stagnant sector is not increasing in relative size, and overall economic growth does not deteriorate over time. Simple substitution yields $L_{1t} = \frac{AL}{1+A}$, hence in this instance

$$g_t = \frac{As_t}{1 + A}$$

The size of the government is again positively related with the labor share (hypothesis 1), and increasingly so with more leftist ideology (hypothesis 2: this time represented by higher values of A). Note however that this time the relationship between government size and the labor share is independent of the level of economic development.

Econometric results that reveal a significant effect of s on g therefore would not by themselves indicate evidence of cost disease. However, as stated, such a relationship is a necessary condition of supply-side explanations of government expenditure. At a very basic textbook level, expenditure increases when costs rise and demand is inelastic. Costs here are represented by the labor share, and inelastic demand is the key feature of Baumol's theory.

In contrast Wagner's (1893) law, at least as conventionally interpreted, stresses increasing demand for government services with rising income per capita. Under certain not implausible conditions demand-side explanations could even imply a negative relationship between the size of government and the labor share: If the public sector were especially labor-intensive (i.e. relative to the private sector) then an increase in the labor-share would represent an increase in the price of public-sector goods and relative expenditure could possibly diminish, depending of course on the price elasticity of demand.

It follows straightforwardly that when the public sector is relatively large, the effect of a change in the labor share on government size is increased. Hypothesis 2 also holds with or

without cost disease, but again is a distinctive feature of supply-side explanations of government size. However, if it is the case that the public sector is increasingly absorbing the workforce - a particular feature of Baumol's theory, then as the economy develops, and thus diverts more of its resources into the public sector, the impact of costs on government size increase. Hypothesis 3 is therefore the sufficient condition of the cost disease explanation of government growth.

3.3 ECONOMETRIC METHODOLOGY

3.3.1 SPECIFICATION

Investigating the determinants of government size over a long period inevitably involves tackling some specification issues. Most often, the time series analyses potentially suffer from omitted variable bias when focusing on one or a few possible determinants of government size. However, a fairly well developed empirical literature emphasizes a small set of variables typically useful to explain government size. Extending the model proposed by Persson and Tabelini (2003), Pickering and Rockey (2011) draw a comprehensive specification including income per capita to proxy the Wagner's law, the share of external trade in GDP following Rodrik (1998), the government's political ideology, demographic variables such as the dependency ratio, the share of the working population in total population and cyclical control variables such as the output gap[8]. Our specification includes all these control variables as well as additional standard controls such as income inequality relying on Meltzer and Richard (1983) and dummies for the war periods thus controlling indirectly for a Peacock-Wiseman effect. Finally, the government size has followed an upward trend during the 20th century in all countries. To avoid any omitted variable bias due a trend in explanatory variables not taken into account in our specification, we include a trend in our specification. Including all these controls, we conduct three sets of regressions testing the hypotheses stemming from our theoretical predictions. Equation (1') includes the labor's share in addition to the controls listed above and provides our basline specification:

$$g_t = a_0 + a_1 s_t + a_2 K_t + a_3 X_t + a_4 t + \varepsilon_t \qquad (1')$$

[8] The output gap is derived from the GDP growth rate using the Hodrick-Prescott filter.

with *t* = year *t*; g_t = government size at *t*; s_t = the labor's share at *t* ; K_t = the government's ideology at *t*; X_t is a vector of control variables including income at *t*; incomes inequality at *t*; proportion of the population over the age of 65 at *t*; proportion of the population between 15 and 64 years of age at t; economy openness at *t*; output gap at *t*; time dummy for war periods; a_0 = constant term; ε_t = error terms at *t*.

It should be noted that in the theoretical model, ideology, representing the society's choice concerning the appropriate level of government intervention, is considered as a constant over time for reasons of simplicity. Contrary to the theory, the econometric model reasonably allows the society' ideology to have varied over time. Therefore, equation (1') is the opportunity to test, what we call hypothesis 0 predicting a positive effect of a leftwing ideology on government size. Indeed, an increasing leftwing ideology can be regarded in the model as a society's choice for a bigger level of government intervention. Equation (1') also tests the validity of hypothesis 1 of the theory predicting a positive effect of the labor's share on the government size.

Hypothesis 2 of the model is tested in equation (2'). Hypothesis 2 predicts that the sensitivity of government size to the labor's share is increasing with leftist ideology. As a consequence, we include in the baseline specification the interaction variable between (leftwing) ideology and labor's share. Naturally, this interaction is expected to have a positive impact on government size. Equation (2') is given by:

$$g_t = b_0 + b_1 s_t + b_2 K_t + b_3 s_t * K_t + b_4 X_t + b_5 t + \varepsilon_t \qquad (2')$$

Finally, hypothesis 3 of the theory expects the sensitivity of government size to labor's share to increase with economic development. This last proposition provides a sufficient condition of the Baumol's law since the impact of costs on government size increases with the economic development. This proposition is tested by estimating a third specification given by equation (3'), including in the baseline specification the interaction term between labor's share and income, Y_t:

$$g_t = c_0 + c_1 s_t + c_2 K_t + c_3 Y_t + c_4 s_t * Y_t + c_5 X_t + c_6 t + \varepsilon_t \qquad (3')$$

3.3.2 METHODOLOGY

We use a simple time series methodology to assess the determinants of government size in France, United Kingdom and United States. Following the reasoning mentioned in the specification section, we conduct for each country three sets of estimations with an OLS method. Our main theoretical predictions involving ideology and labor share does not seem to suffer from reverse causality bias. First, the society's ideology is not suspected to be determined by the size of government. Furthermore, this concern is mitigated by the inclusion of the lagged dependent variable. Indeed, the specification provides the contemporaneous relationship between the variables while ideology is traditionally supposed to be effected by long-term factors[9]. Second, while government size is unlikely to affect labor share, it remains possible that a third dynamic drives both labor share and government size. Indeed, the labor share has its own driving variables, which problematically also may independently drive government size. One possibility is due to the economic cycle: different macroeconomic theories posit different predictions for the cyclical behavior of the labor share. In simple real business cycle models it is acyclical. In "old Keynesian models" - emphasizing nominal wage rigidity, the labor share can be anti-cyclical depending on the elasticity of demand for labor. In contrast the new Keynesian literature, as exemplified by Gali and Gertler (1999), emphasizes price-stickiness, which implies a pro-cyclical labor share. To address this problem the regression analysis includes controls for the output gap. The labor share may also be a reflection of changing preferences, tastes or ideology towards inequality in society. A high labour share may indicate an egalitarian ideology as society sets institutions and policies in order to increase relative rewards to workers rather than owners of capital. However, the regression analysis includes ideology and income inequality.

Regarding the estimation method, we follow the basic methodology proposed by Ram (1987). This consists in estimating the variables in level since the correlation between the first differences could partly reflect the short-term pro- or counter-cyclical public policy measures. However differently from Ram, we specify a linear relationship and not in log-levels that would be somewhat arbitrary. To avoid the problem of spurious regressions due to non-stationarity of the variables, as illustrated by Granger and Newbold (1977), we also allow the error term to be autoregressive. This comes to estimating the relationship through a feasible least-squares procedure subject to the postulate of a first-order autoregressive process for the stochastic term. This hypothesis is verified because the estimates indicate that the autoregressive parameter is sizeable and statistically significant in most cases. Therefore, by

[9] See Pickering and Rockey (2011) for a discussion of the factors affecting ideology.

including an autoregressive term in the baseline specification, equation (1') yields the following equation:

$$g_t = a_0 + a_1 s_t + a_2 K_t + a_3 X_t + a_4 t + a_5 g_{t-1} + \varepsilon_t \quad (4')$$

Therefore, considering the period *t-1*, equation (4') can be rewritten as follows:

$$g_{t-1} = a_0 + a_1 s_{t-1} + a_2 K_{t-1} + a_3 X_{t-1} + a_4 (t-1) + a_5 g_{t-2} + \varepsilon_{t-1} \quad (5')$$

By substracting (4') from (5'), we have:

$$\Delta g_t = a_4 + a_1 \Delta s_t + a_2 \Delta K_t + a_3 \Delta X_t + a_5 \Delta g_{t-1} + \varepsilon'_t \quad (6')$$

With $\Delta(.)$: the first difference operator; a_4: a constant term and $\varepsilon'_t = \varepsilon_t - \varepsilon'_{t-1}$.

Our baseline specification amounts to equation (6') considering the first differences of the variables. As a consequence, whether the variables of our model are stationary or integrated of the first order, our baseline specification is not subject to spurious regressions.

Furthermore, given the presence of the lagged dependent variable in the specification, the estimates provide the current period (or short-run) impact of government size and ideology. The long run effect of these variables can be calculated by multiplying the point estimate by $1/(1 - a_5)$, where a_5 is the point estimate of the lagged dependent variable.

Finally, the estimation method has to take into account the structural breaks in our series. In particular, the determinants of the growth of government size may have strongly evolved over the 20th century, especially before and after the Second World War. Indeed, the war corresponds to a change in both the level and the structure of public expenditures. We notice that for the three countries, the Second World War has had a long-lasting effect, called Peacock and Wiseman effect. After 1945, government spending kept on increasing without returning to pre-war levels. This period also corresponds to the building of the Welfare State that sharply influenced both the level and the composition of public expenditure with an increasing part of social spending and thus of public services. This may have reinforced the phenomenon of cost disease, thus provoking a break in the relationship between labor's share and government size. To address this potential break in the evolution of government size, we re-estimate the models for subsamples. For this purpose, we split our whole period covering approximately the 20th century into two sub-periods, one before 1938 and the other after 1946.

Therefore we are led to estimate for each country the three specifications for the whole period such as the two sub-periods.

3.4 DATA

The data are annual and the sources are described in appendix. Table 3.14 in appendix provides the variables'difinitions common the the three countries. Tables 3.15, 3.16 and 3.17 in Appendix present the sources and the statistics of the data for each country. Concerning the independent variables, we consider the total public expenditure including all levels of the public sector and all kinds of public expenditures, as a percentage of total output. For the United-States, we build this variable for the period 1869-2005 based on two sources, the *Statistical Abstract of the United States* and the *Economic Report of the President*[10]. For the numerator, we use the sum of the expenditures of the federal, state and local government expressed in thousand current dollars. For the denominator, we employ the Gross National Product in thousand current dollars. For the United-Kingdom, based on Mitchell (2007a), the variable of government size is available from 1869 to 2003 and corresponds to the total government spending as a ratio of the Gross Domestic Product. Like Florio and Colautti (2005) for France, we used the historical data of André and Delorme (1983), covering the period 1871-1974, but excluding the war periods 1914-1919 and 1939-1946[11]. They provide data on the ratio of total public expenditure (central state, social protection and local public authorities) to the output. We connect this series with the official data of the National Institute of Statistics and Economic Studies, which provides data on total government size from 1959. Figure 3.1 depicst the data for the three countries. We notice a common upward trand in government size over the 20th century for the three countries. This common trend can be decomposed into a stable trend until the First World War and a stready increase afterwards. However, like much other OECD countries, government size stabilized from the 1990s. In spite of this common evolution, we can notice some discrepencies between the three countries. The american level of government size has bee constantly below the British level which has been itself constantly below the French level all over the observation period. This can be reflected in the means of the variables: 20% for the U.S., 26% for the U.K. and 31%

[10] We followed the methodology proposed by Grossman (1987).
[11] The demand size explanation requires a democratic process. A good reason to exclude the war periods in the French case is that France was not democratic during the World War 2.

for France given that the French means is artificially lows because data is not available for the war years.

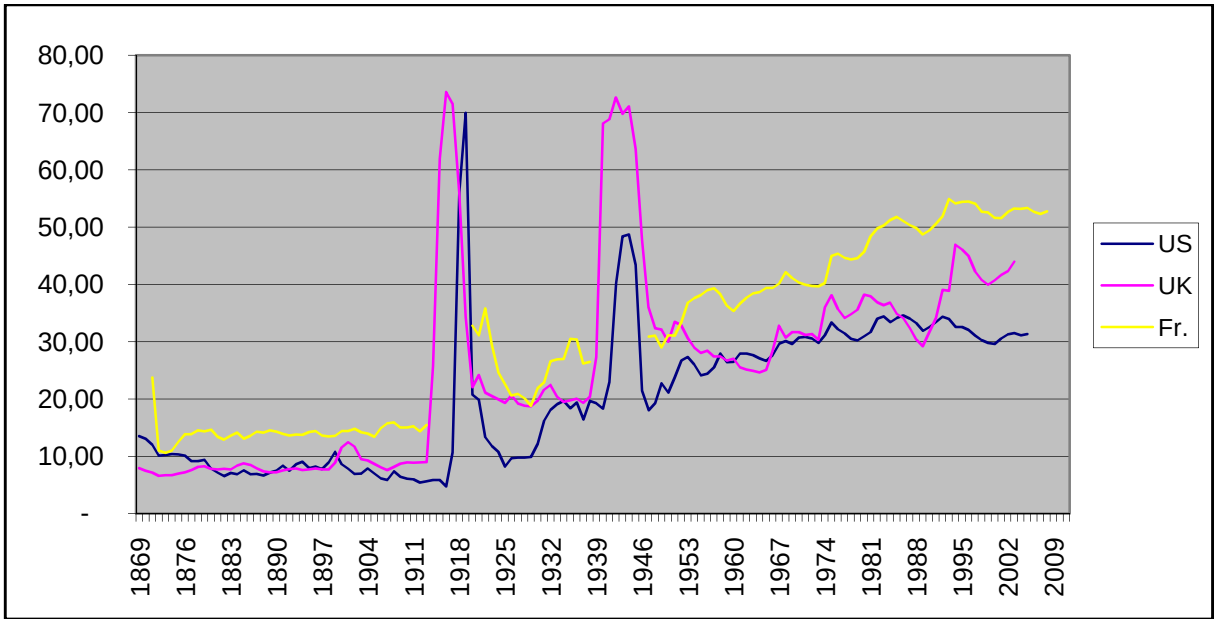

Fig. 3.1
Government size in the U.S., U.K. and France – 1869-2008

To build the variable of the labor's share in the national income for the priod 1900-2011 for the U.S., we use the data proposed by Klein and Kosobud (1961) for the period 1900-1953 and we followed Gollin (2002) who uses the data provided by the U.S. Department of Labor: Bureau of Labor Statistics, available for the period 1947-2011. For the UK, we also follow Gollin (2002) for the period 1869-1980, which employs the data of Mitchell (1988, p.828) of income from employment divided by the national income. We connected this series with the series of labour income share ratio proposed by the OECD, available from 1981 to 2011. For France, we used the data of the labor's share in the total value-added availalble on Piketty'swebsite[12] from 1896 to 2008. Figure 3.2 depicst the data for the three countries. We can notice that labor is rather stable for the three countries. This evolution is consistent with the result of the litereture according to which this variable is found to be stationary (Gollin, 2002). The levels of labor share for the three countires can be hardly compared; the data coming from different sources with sometimes different definitions (see Klein and Kosobud (1961) for a discussion of the varying definitions).

[12] http://piketty.pse.ens.fr/fichiers/public/Grasset2001/Livre/TabChap1.xls

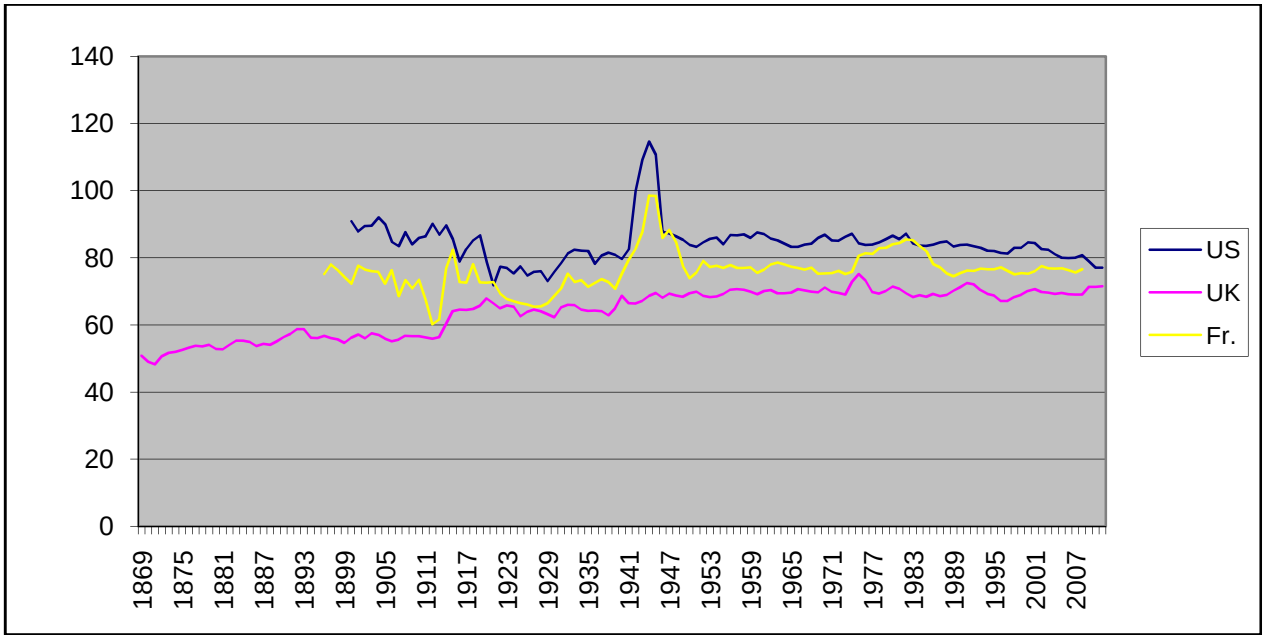

Fig. 3.2
Labor share in the U.S., U.K. and France – 1869-2008

The principal ideology index used in this paper is a dummy variable, *left dummy*, coded 1 when the majority of the Lower Chamber of the partliament is composed of left-wing deputies and 0 otherwise. In the absence of an index of government's political ideology over such long periods as ours, taking such a basic measure presents several advantages. Indeed, it relies on similar common features of the political institutions of the three countries counsidered. First, the three countires have in common to have a lower chamber that holds the legislative power and that is elected by the universale (male) suffrage from the beginning of our observation period. Second, because these countries have a traditional bipartite political system from at least the end of the 19th century, the relative political color of the governing party can esaily be identified at any period of time. Third, a dichotomic ideology index enables us to avoid the tricky issue of the intensity of the government's ideology, which can be more or less right(-left)-wing. Nonetheless, it is important to verify that results obtained with alternative measures, and especially more accurate indexes, are not meningfully different. We also choose the dummy variable as our main ideology index since it enables comparisons between the coubtries. Indeed, a dummy variable provides the same raw information for the three countries while an index measuring for instance the seats percentage of the parties can be influenced by the political (proportional/majoritarian) system inherent in each country.

However, one way to address the issue of the intensity of the government's ideology is to consider the percentage of rightwing deputies in the Chamber. This index allows us to take into account the demand-driven ideological change in the sense that voters express their preferences for more or less left (/right). This index also allows to take partially into account the supply-driven change in the sense that a large majority in the parliament can pass a bill more eseally, especially because some bills require more than the absolute majority to be passed. For this purpose, we build a continuous index, *left ideology*, indicating the percentage of left-wing seats in the Chamber. It is distributed between 0 and 1; 0 reflecting the absence of left-wing members in the Chamber, and 1, a Chamber totally filled with left-wing deputies. In this manner, we can build an alternative measure of ideology for the whole period for each country. As expected, the ideology variables, *left-dummy* and *left ideology*, are positively correlated for the three countries (see Tables 3.18, 3.19 and 3.20 in Appendix).

However this index does not take into account the fact the right(-left)wing ideology evolves through time, an important feature of the supply-driven ideological change. To address this issue, we use an index coming from the Manifesto Research Group (MRG) data of Budge et al. (2001), only available from around 1945. This index provides the median voter ideological position in each country by weighting party ideologies according to their votes received. The MRG data are a time-varying, cross-country measure of party positions, which allows comparisons between the results obtained for each country. This variable,*left mainfesto*, is measured from -100 to +100 so that -100 is extreme right and 100 is extreme left. This index can be used as a robustness check for the post-Second World War sub-period. This ideology index is significantly different from the previous indeology measures.Indeed,they are either not correlated nor the French case or negatively correlacted for the U.K. and the U.S. cases.

For the three countries, the variable *income* is given by the real GDP per capita. For that, we use the data of the GDP levels in million 1990 internatioal Geary-Khamis dollars and data of the total population size, coming both from Maddison's webiste, available from 1869 to 2008. The variable *output gap* comes from the same source and measures the deviation of aggregate output from its trend value in percentage. For the three countries, the main measure of incomes inequality, *income*, represents the share of personnal income of the top 0.05% percentile group in the country. The data is provided by Atkinson (2005). As alternative measures of inequality, we also resort to the share of personnal income of the top 0.1% and the top 0.01% percentile groups in each country. The data are available for the periods 1913-2000 for the U.S., 1908-2000 for the UK and 1915-1998 for France.

The age dependancy ratio, *prop65*, is given by the proportion of the population over the age of 65 and the share of the active population, *prop1564*, is given by the proportion of the population between 15 and 64 years of age. The variable *openess* measures the ratio of external tade (inports+exports) as a percentage of output. For the U.S., the last three variables are provided by the United State Census Bureau (2012)[13] from 1900 to 2002. For the UK, the last three variables comes from Mitchell (2007a). As the data related to openness ends in 1993 for the U.K., we complete it for the last years with the data of Penn World Table[14]. For France, the data for the demographic variables come from Mitchell (2007a) and the data for openness comes from Asselain and Blancheton (2005).

3.5 RESULTS

3.5.1 FRANCE

Tables 3.1 contains the estimation results for France for the whole periods 1921-1998 while Table and 3.2 contains the results for France for the sub-periods 1921-1938 and 1946-1998. Column 1 of Table 3.1 presents the results of the baseline specification including the lagged dependent variable, labor share, left dummy and income along with a set of control variables not reported here for the sake of clarity. We can notice that the model does well in explaining government size with an adjusted R^2 of 0.98. In this specification, real income per capita does not reach significance, providing no support for the Wagner's law explanation of government size. Columns 1a and 1b of Table 3.2 presents the estimate results for the same specification for sub-periods. The absence of significance of income is supported in these estimates. Importantly, concerning hypothesis 0, the ideology index, *left dummy*, is not statistically significant for the total period and for the pre-war period but is positive and significant at the 5% level fro the post-war period. Given the presence of the lagged dependent variable, the parameter estimates reflect the current-period (or short-run) impact of the explanatory variables. The long-run can be recalculated and is given by 0,844/(1-0,585) = 2,033. This effect is sizeable since and can be interpreted as follows. The long run impact of a switch from a totally rightwing parliament to a totally leftwing one is an increase in the size of

[13] The electronic format of the database is provided by the United State Census Bureau (2012). For a hardcopy, see also Mitchell (2007b).
[14] https://pwt.sas.upenn.edu/

government of 20%. Thus hypothesis 0 receives a strong support only for the second subperiod for France.

Table 3.1
The determinants of government size in France – total sample period

	government size (1921-1998)		
	(1)	(2)	(3)
lagged government size	0.641*** (0.057)	0.593*** (0.069)	0.645*** (0.056)
labor share	0.145* (0.083)	0.230** (0.100)	0.020 (0.117)
left dummy	0.132 (0.288)	-9.170* (0.470)	0.135 (0.285)
labor share*left dummy	-	0.122* (0.071)	-
income	0.3405 (0.537)	0.136 (0.555)	-0.572 (1.035)
labor share*income	-	-	0.012 (0.011)
Observations	69	69	69
Adjusted R^2	0.987	0.987	0.986

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the outliers. (2) the war years are excluded from the sample. (3) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (4) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.2
The determinants of government size in France – subperiods

	government size (1921-1938)			government size (1948-1998)		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
lagged government size	0.035 (0.257)	0.047 (0.216)	-0.283 (0.199)	0.585*** (0.125)	0.586*** (0.126)	0.573*** (0.112)
labor share	-0.833 (0.521)	-1.609** (0.646)	-6.268*** (1.069)	0.180** (0.087)	0.164 (0.114)	-0.142 (0.123)
left dummy	-0.699 (0.954)	87.71 (54.65)	-1.251* (0.595)	0.844** (0.388)	2.872 (8.814)	0.992** (0.385)
labor share*left dummy	-	-1.286 (0.795)	-	-	-0.026 (0.111)	-
income	-12.94 (12.72)	-28.44* (12.12)	-100.9*** (15.23)	0.050 (0.838)	-0.012 (0.918)	-2.848* (1.445)
labor share*income	-	-	1.397*** (0.255)	-	-	0.034** (0.014)
Observations	18	18	18	51	51	51
Adjusted R^2	0.889	0.918	0.963	0.978	0.978	0.980

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, income, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Concerning hypothesis 1, the labor share is estimated to be positive and significant at 10% for the whole period. This low level of significance can be explained by the absence of effect of labor share in the first subperiod and a effect significant at the 5% for the second subperiod, as shown by Table 3.2. According to the estimated coefficient of column 1b, Table 3.2, a sustained one percent increase in the labor share is estimated to result in an increase in the size of government by 0.43% of GDP. Like hypothesis 0, hypothesis 1 is supported only for the post-war period for France.

In columns 2 and 3, Table 3.1, interaction terms are included, with the objective of testing hypotheses 2 and 3. The first interaction term is the product of the labor-share and left dummy over the full sample. This variable has an expected positive coefficient and is significant at the 10% level (column 2). However, when reestimating this specification for subperiods in columns 2a and 2b of Table 3.2, this variable is no more significant. Therefore, hypothesis 2 is never supported in the French case. The second interaction term is the product of the labor-

share and income. Column 3, Table 3.1, shows that this variable is positive as expected but not significant. However, when the estimates results for subperiods show that this variable positively and significantly affects government size (columns 3a and 3b, Table 3.2). The discrepancy between the significance for the whole period and subperiods can be explained by the fact that estimates for the whole period include the war years that can bias the estimates. Thus we can consider that hypothesis 3 is verified in France for the whole period. Being a sufficient condition of the Baumol's cost disease, the validity of hypothesis 3 supports that increase in costs is a driver of the growth of government in the 20th century.

3.5.2 UNITED KINGDOM

Tables 3.3 and 3.4 presents the estimate results in the United Kingdom for the whole period (1908-1999) and both subperiods (1908-1938 and 1946-1999), respectively. Colum 1 Table 3.3 estimating the baseline specification shows an statistically insignificant effect of income. This is confirmed for the first subperiod (column 1, Table 3.4) while estimates for the second subperiod shows a significant and negative effect of income on government size. In both case, the Wagner's law predicting a positive effect of income is not supported for the U.K. case. More importantly, the ideology index is not significant for the total period and the post-war period but is positively and statistically significant at 7% for the pre-war period. This provides some supports for hypothesis 0 before the Second World War for the U.K.. Regarding hypothesis 1, the estimate results consistently shows that the labor share positively and significantly affects government size, for the whole period as well as the sub-periods. However, the magnitude of the long-run effect of labor share differs between the subperiods. Indeed, according to the estimated coefficients of columns 1a and 1.b, Table 3.4, a sustained one percent increase in the labor share results in an increase in the size of government by 5.33% before the war and 1,95% afterwards.

Table 3.3
The determinants of government size in the U.K. – total sample period

	government size (1908-1999)		
	(1)	(2)	(3)
lagged government size	0.681***	0.6768***	0.687***
	(0.040)	(0.037)	(0.041)
labor share	0.486***	0.506***	0.270
	(0.149)	(0.147)	(0.391)
left dummy	-1.029	-3.022	-1.003
	(0.652)	(11.36)	(0.608)
labor share*left dummy	-	0.030	-
		(0.166)	
income	0.432	0.143	-2.000
	(0.474)	(0.879)	(3.385)
labor share*income	-	-	0.025
			(0.036)
inequality	-0.084	0.147	0.410
	(0.714)	(0.760)	(0.804)
Observations	92	92	92
Adjusted R^2	0.982	0.984	0.984

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, prop1564, prop65, openness, output gap, and time dummy variables for the two world wars and the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.4
The determinants of government size in the U.K. – subperiods

	government size (1908-1938)			government size (1946-1999)		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
lagged government size	0.411**	0.376***	0.406**	0.618***	0.638***	0.687***
	(0.150)	(0.126)	(0.150)	(0.063)	(0.061)	(0.044)
labor share	3.140**	4.259***	1.793	0.747***	0.716***	-0.696
	(1.224)	(1.179)	(8.849)	(0.164)	(0.207)	(0.641)
left dummy	5.863*	-200.2**	6.105	-0.237	8.875	-0.643
	(3.165)	(76.83)	(4.020)	(0.554)	(17.13)	(0.431)
labor share*left dummy	-	3.247**	-	-	-0.135	-
		(1.209)			(0.247)	
income	15.19	12.36	-1.678	-3.998***	-3.857***	-12.02***
	(11.23)	(9.001)	(110.1)	(0.928)	(0.905)	(3.801)
labor share*income	-	-	0.272	-	-	0.118**
			(1.739)			(0.049)
inequality	9.266***	6.426**	9.049***	3.369***	3.402***	3.501***
	(2.601)	(2.358)	(3.059)	(0.769)	(0.754)	(0.774)
Observations	31	31	31	54	54	54
Adjusted R^2	0.951	0.962	0.948	0.937	0.950	0.966

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, prop1564, prop65, openness, output gap, and time dummy variables for the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

We now estimate the subsequent hypotheses. The estimation results support hypothesis 2 concerning the conditional effect of labor cost to the government's ideology only for the pre-war period. Indeed, the interaction variable between *labor share* and *left dummy* has a positive and significant only for the period 1908-1938. This could suggest that the cost disease concerns especially the pre-war period. However, hypothesis 3, the sufficient condition of a cost disease is only supported for the post-war period. In column 3b, Table 3.4, the interaction variable between labor share and income is positive and statistically significant. Therefore, the sufficient condition of the cost disease is supported for the post-war period. The absence of evidence for hypotheses 0 and 2 in spite evidence of cost disease for the post-war period can be explained by the fact the left-right ideological divide in the U.K. after the war is not only structured around the preference for the appropriate level of government intervention in

the economy. Some other significant dimensions may have influenced the post-war right-left divide thus making ideology innapropiate to proxi the society's choice concerning the appropriate level of government intervention. In any event, the evidence that Baumol's cost disease is only supported for the most recent sub-period is in line with our assumption that the impact of costs on government size increases as the economy develops.

Concerning the control variables, incomes inequality is an important driver of government size in the U.K.. Indeed, income inequality is positive and statistically significant for both sub-periods. Thus, the hypothesis of Meltzer and Richard (1981) receives strong empirical support for the English case.

3.5.3 UNITED STATES

Table 3.5 and 3.6 report the estimation results for the United States for the whole period (1913) and the subperiods (1913-1938 and 1846-2000). Concerning the ideology variable, the results do not speak volume. The coefficients hardly reach the 10% significance level. The coefficient of left dummy has an expected positive sign for the whole period according to column 1, Table 3.5, but only at the 10% significance level. Moreover, the variable does not reach significance for the sub-periods (columns 1.a and 1.b, Table 3.6). Thus hypothesis 0 is hardly supported here. Concerning, hypothesis 1, column 1, Table 3.5, shows a positive and statistically significant effect of labor share on government size for the whole period. However, this variable is no longer significant when re-estimating the model for the pre- and post-Second World War sub-periods, as shown in columns 1a and 1b, Table 3.6. The absence of significance of labor share for sub-periods comes from the fact that the regressions for sub-periods exclude the war years. When estimating the model for the period 1939-2000 including the war years, *labor_share* turns out to be positive and statistically significant. However, these estimates are not reported here. That leads us to think that for the American case, hypothesis 1 does not hold outside these periods.

Table 3.5
The determinants of government size in the U.S. – total sample period

	government size (1913-2000)		
	(1)	(2)	(3)
lagged government size	0.196***	0.197***	0.195***
	(0.045)	(0.042)	(0.042)
labor share	0.449***	0.522***	0.296
	(0.095)	(0.090)	(0.337)
left dummy	1.086	-27.10*	1.030
	(1.036)	(15.61)	(1.031)
labor share*left dummy	-	0.340*	-
		(0.188)	
income	-0.326	-0.567	-1.583
	(0.419)	(0.399)	(2.435)
labor share*income	-	-	0.015
			(0.028)
Observations	88	88	88
Adjusted R^2	0.961	0.963	0.961

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the two world wars and the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.6
The determinants of government size in the U.S. – subperiods

	government size (1913-1938)			government size (1946-2000)		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
lagged government size	0.398 (0.239)	0.388 (0.240)	0.412 (0.240)	0.188** (0.071)	0.193** (0.082)	0.202*** (0.073)
labor share	0.523 (1.214)	-0.074 (1.307)	-1.683 (6.405)	0.100 (0.142)	0.089 (0.163)	-0.426 (0.500)
left dummy	-14.00 (14.87)	58.21 (132.0)	-14.52 (14.39)	-0.413 (0.894)	3.335 (20.371)	-0.716 (0.914)
labor share*left dummy	-	-0.920 (1.684)	-	-	-0.044 (0.246)	-
income	-15.27 (9.754)	-14.38 (9.155)	-48.12 (94.48)	-2.114** (0.787)	-2.145** (0.836)	-4.638** (2.117)
labor share*income	-	-	0.426 (1.215)	-	-	0.031 (0.023)
Observations	26	26	26	55	55	55
Adjusted R^2	0.748	0.737	0.732	0.918	0.916	0.918

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, incquality, prop1564, prop65, openness, output gap, and time dummy variables for the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Hypothesis 2 predicting an increasing effect of the labor share with a left-wing ideology does not receive robust empirical support for the U.S.. Indeed, column 2 of Table 3.5 shows, for the whole period, a positive effect of the interaction term between labor share and left dummy, but only significant at 10%. When spiting the period, the coefficient of this variable does not reach significance (columns 2a and 2b, Table 3.6). Table 3.5 also shows that hypothesis 3 is never supported, whatever the sample period. Indeed, the interaction variable between labor share and income, while positive, does not reach significance. In brief, the theory does not support any support with the U.S. data.

3.5.4 ROBUSTNESS CHECKS

In the robustness checks, we investigate more thoroughly hypotheses 0 and 2 with alternative measures of ideology. We use an index based on the seats percentage of the leftwing parties, available for the whole period. We use also an index based on the evolution of the parties' manifesto with data provided by Budge et al. (2001). In this set of regressions, we reestimate the baseline specification and the specification with the interaction between the ideology variable and labor share for each country and for each sample period to check the sensitivity of the estimates results.

Tables 3.7 and 3.8 provide these robustness checks for France for the whole period and the subperiods, respectively. In general, the use of *left ideology* instead of *left dummy* provides more support for hypotheses 0 and 2. Indeed, for the whole period, hypothesis 0 becomes significant at 10% while it did not reach significance in the previous estimates. Moreover, Hypothesis 2 becomes significant at the 5% level while it was significant at 10% prior. For the first subperiod, hypothesis 0 is not verified with the new measure while hypothesis 2 that was not significant prior becomes significant at 5%. For the second subperiod, the results are unchanged: hypothesis 0 is still significant and hypothesis 2 is still insignificant. However, when using the ideology measure based on the parties' manifesto for the second subperiod, hypothesis 0 is not verified while hypothesis 2 received a strong support.

Tables 3.9 and 3.10 provide these robustness checks for the U.K. for the whole period and the subperiods, respectively. Basically, the conclusion regarding hypotheses 0 and 2 are unchanged, except for the first subpriod for which left ideology provides lower level of significance but consistent coefficients. Finally, Tables 3.11 and 3.12 provide the robustness checks for the U.S.. Using alternative ideology indexes for the U.S. does not modify the conclusions concerning the few support for hypotheses 0 and 2. With *left ideology* as an alternative index, hypothesis 2 seems to be supported for the first subperiod but only at the 10% level.

Table 3.7
Robustness Checks
The determinants of government size in France – total sample period

	government size (1921-1998)	
	(1)	(2)
lagged government size	0.656*** (0.058)	0.580*** (0.074)
labor share	0.122 (0.083)	0.410** (0.162)
left ideology	1.611* (0.887)	-38.70* (20.64)
labor share*left ideology	-	0.52** (0.269)
Observations	69	69
Adjusted R^2	0.987	0.988

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, income, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the two world wars and the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.8
Robustness Checks
The determinants of government size in France – subperiods

	government size (1921-1938)		government size (1948-1998)			
	(1a)	(2a)	(1b)	(2b)	(1b)	(2b)
lagged government size	0.029 (0.268)	-0.316 (0.268)	0.503*** (0.126)	0.503*** (0.127)	0.615*** (0.135)	0.597*** (0.112)
labor share	-0.803 (0.556)	3.155** (1.294)	0.1459* (0.080)	0.151 (0.2091)	0.197* (0.100)	0.275*** (0.085)
left ideology	-3.491 (5.269)	-575.23** (202.20)	3.456*** (1.213)	2.750 (25.274)		
labor share*left ideology		8.436** (2.979)		0.009 (0.322)		
left manifesto					0.008 (0.029)	-1.271*** (0.467)
labor share*left manifesto						0.016*** (0.005)
Observations	18	18	51	51	50	50
Adjusted R^2	0.889	0.941	0.981	0.981	0.976	0.979

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, income, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.9
Robustness Checks.
The determinants of government size in the U.K. – total sample period

	government size (1908-1999)	
	(1)	(2)
lagged government size	0.691***	0.688***
	(0.038)	(0.035)
labor share	0.488***	0.295
	(0.147)	(0.339)
left ideology	-0.058*	0.297
	(0.030)	(0.445)
labor share*left ideology	-	-0.005
		(0.006)
Observations	92	92
Adjusted R^2	0.983	0.985

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, income, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the two world wars and the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.10
Robustness Checks.
The determinants of government size in the U.K. –subperiods

	government size (1908-1938		government size (1946-1999)			
	(1a)	(2a)	(1b)	(2b)	(1b)	(2b)
lagged government size	0.396**	0.405**	0.615***	0.631***	0.589***	0.603***
	(0.170)	(0.156)	(0.064)	(0.061)	(0.073)	(0.073)
labor share	2.945**	6.278**	0.726***	0.559	0.725***	0.690***
	(1.273)	(2.428)	(0.168)	(1.000)	(0.159)	(0.188)
left ideology	-0.009	-4.191*	0.007	0.263	-	-
	(0.088)	(2.350)	(0.039)	(1.319)		
labor share*left ideology	-	0.062*	-	-0.004	-	-
		(0.036)		(0.019)		
left manifesto	-	-	-	-	0.009	-0.663
					(0.028)	(1.239)
labor share*left manifesto	-	-	-	-	-	0.009
						(0.017)
Observations	31	31	54	54	52	52
Adjusted R^2	0.941	0.945	0.937	0.948	0.936	0.948

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, income, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.11
Robustness Checks.
The determinants of government size in the U.S. – total sample period

	government size (1913-2000)	
	(1)	(2)
lagged government size	0.198***	0.206***
	(0.042)	(0.043)
labor share	0.451***	0.747
	(0.093)	(0.564)
left ideology	-0.002	-0.523
	(0.040)	(0.977)
labor share*left ideology	-	0.006
		(0.011)
Observations	88	88
Adjusted R^2	0.960	0.960

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, income, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the two world wars and the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

Table 3.12
Robustness Checks.
The determinants of government size in the U.S. –subperiods

	government size (1913-1938)		government size (1946-2000)			
	(1a)	(2a)	(1b)	(2b)	(1b)	(2b)
lagged government size	0.441**	0.439**	0.202***	0.212**	0.458***	0.464***
	(0.159)	(0.147)	(0.068)	(0.081)	(0.140)	(0.137)
labor share	1.076	3.364***	0.054	-0.224	-0.022	-0.430
	(1.074)	(0.870)	(0.124)	(0.785)	(0.154)	(0.329)
left ideology	-0.660**	-4.076**	-0.046	0.483	-	-
	(0.267)	(1.769)	(0.038)	(1.447)		
labor share*left ideology	-	0.046*	-	-0.006	-	-
		(0.021)		(0.017)		
left manifesto	-	-	-	-	-0.120*	2.840
					(0.062)	(2.339)
labor share*left manifesto	-	-	-	-	-	-0.035
						(0.028)
Observations	26	26	55	55	49	49
Adjusted R^2	0.826	0.837	0.921	0.919	0.925	0.925

Notes: (1) each regression includes the following variables that are note reported in the table: a constant, income, inequality, prop1564, prop65, openness, output gap, and time dummy variables for the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bera test was performed on the residuals of each regression to check the normality of the residuals.

3.5.5 DISCUSSION

No variable emerged from our empirical analysis as a common and consistent determinant for the three countries. Concerning the demand-side explanation, the popular Wagner's law received no support for any of the three countries. However, hypothesis 1 introducing a new determinant of government size in the literature, i.e. the labor's share, receives some support for the three countries. Indeed, as shown in Table 3.12 that summarize the regressions outcomes regarding our hypotheses, labor share appears as a determinant for the three countries for the total sample period. However a closer to the pre-war and post-war subperiods indicates that this determinant affects government size especially during the post-war subperiod for France and all over the period for the U.K. However, the impact of labor share in the U.S. case seems to come from the war period and is not more valid when excluding the war periods from the regressions.

Table 3.13
Summary of the findings

	total period	pre-war period	post-war period
H0: positive effect of left ideology	-	UK*	France***
H1: positive effect of labor share	France*, UK***, US**	UK**	France**, UK***
H2: positive effect of labor share*left ideology	France*, US*	UK**, US*	France**
H3: positive effect of labor share*income	-	France***	France**, UK**

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%.

Besides, we argued that a positive effect of labor share is not a sufficient condition for the Baumol's cost disease and found that hypothesis 3 was verified for the whole period for France and only for the post-war period for the U.K. but never in the U.S. case. In addition we know that the U.S. has had a relatively low government size all over the sample period while France has had a relatively high one during the same period. This suggests that the Baumol's cost disease explains the differences in government size among countries. Indeed, the U.S. has had a rather low government size and has not been affected by the cost disease. France has experienced a high government size and has been early affected by the cost disease. The U.K. government size has been medium compared to the two other countries and has been influenced by the cost disease only in the post-war period. Moreover, the absence of cost disease in the U.S. case departs from the abundant literature finding a significant role of the cost disease in the explanation of the growth of the U.S. government (see for instance Borcherding, 1985; Ferris and West, 1996). We argued here theoretically and empirically that their finding can be biased due to a measurement problem of the government's cost.

However, hypothesis 0 assuming a static effect of ideology received robust empirical support only for the post-war France but not for the other countries. By contrast, hypothesis 3 suggesting a dynamic effect of ideology varying with the labor share received support for the pre-war U.K. and U.S. and the post-war France. This proves the relevance of proposing dynamic models with a varying effect of ideology. Our evidence of a conditional effect of ideology is in line with Pickering and Rockey (2011) and Fachini, Melki and Rockey (2012). They document, with OECD data, a conditional effect of ideology to income and labor share, respectively. As mentioned above, the little evidence for hypothesis 0 of a static effect of ideology can stem from the fact that a leftwing ideology is not always a good proxy for the

society's choice of higher government size. Indeed, our findings suggest that in the U.S. and in the post-war U.K., the right-left divide has not been structured by this issue.

3.6 CONCLUSION

This paper proposed an original test of the Baumol's costs disease. Based on the model developed by Fachini, Melki and Pickering (2012), we investigated the ability of this model to explain the differences in the evolutions of the government size in the U.S., the U.K. and France over the 20th century. Contrary to the literature that traditionally measures the cost disease with the difference between the private sector price deflator and the government's implicit price deflator, we use the labor's share as a supply-side explanation of the growth of government. We argued theoretically that the positive effect of the labor's share on the government size increases with a left-wing society and with the economic development. We found empirically that the cost disease, as defined in our theory, has affected the countries with higher government sizes. This could explain the rather high French government size from the 1920s and the U.K. government size from the end of the Second World War. Contrary to an established result of the empirical literature on the U.S., we found no evidence of the Baumol' hypothesis for this county.

The demand-size explanation of the growth of governments did not receive strong support with our data. Indeed, we found no evidence of the Wagner's law. The explanation based on the voters' preferences for more or less government intervention received strong support only for France for the post-second-world-war period. While this explanation cannot explain the relatively high government size in the pre-war period, the voters' ideology is a good candidate to explain the growth of government during the post-war period. Besides, the explanation of Meltzer and Richerd (1981) based on a model of median voter received empirical support only for the U.K. while Meltzer and Richerd (1983) provided empirical evidence with data in the U.S..

Our findings prove the relevance of studying the determinants of government growth for different countries and different periods. Indeed, each country turns out to have its own determinants that could vary temporally. Further research on the topic requires additional dynamic explanations taking into account the conditional effects of the determinants of the size of government.

APPENDIX

Table 3.14
Variables' definition

variable	definition
government size	total public spending (central, Social security and local admin) as a percentage of total output
income	GDP levels in million 1990 International Geary-Khamis dollars per capita
inequality	share of total personal income of the top 0.05% percentile groups in Fr
labor share	labors's share in the national income
left dummy	dummy coded 1 when the majority in the lower chamber of the parliament is Republican (U.S.) / Conservative (U.K.) / rightwing (France), 0 when it is Democrat
left manifesto	ideology for the median voter (generated from the raw party data). This is measured from -100 to +100 so that -100 is extreme right and 100 is extreme left
left ideology	percentage of Republican/Conservative/rifgtwing seats in the lower chamber
openness	total exports+general imports as a percentage of GDP
output gap	derived from the real GDP growth rate using the Hodrick-Prescott filter (6.26)
prop1564	percentage of population aged 14<age<65
prop65	percentage of population aged 65 and over
WW1	dummy coded 1 for the years of World War 1 and 0 otherwise
WW2	dummy coded 1 for the years of World War 2 and 0 otherwise

Table 3.15
Variables' sources and statistics for the U.S.

	mean	max.	min.	std. sev.	obs.	source
government size	20,53	69,95	4,76	12,32	137	Statistical Abstract of the United States Economic Report of the President
income	11,04	31,36	2,44	8,34	139	Maddison's website. Historical Statistics of the World Economy, Table 2
inequality	4,33	9,87	1,89	2,13	88	Atkinson (2005)
labor share	84,28	114,60	71,80	6,14	112	Klein and Kosobud (1961) U.S. Department of Labor: Bureau of Labor Statistics
left dummy	0,36	1,00	0,00	0,48	106	United State Census Bureau (2012)
left ideology	45,15	69,52	20,55	9,98	106	United State Census Bureau (2012)
left manifesto	11,28	22,62	1,64	5,74	49	Budge et al. (2001)
openness	-	-	-	-	-	United State Census Bureau (2012)
output gap	-	-	-	-	-	own calculation
prop1564	-	-	-	-	-	United State Census Bureau (2012)
prop65	-	-	-	-	-	United State Census Bureau (2012)

Table 3.16
Variables' sources and statistics for the U.K.

	mean	max.	min.	std. sev.	obs.	source
government size	25,92	73,61	6,58	16,96	135	Mitchell (2007a)
income	8,54	23,74	3,03	5,50	140	Maddison's website. Historical Statistics of the World Economy, Table 2
inequality	3,47	8,53	0,79	2,46	93	Atkinson (2005)
labor share	64,07	75,16	48,27	6,79	143	Mitchell (1988) OECD website
left dummy	0,59	1,00	0,00	0,49	142	Mitchell (2007a)
left ideology	49,19	76,42	23,28	12,86	142	Mitchell (2007a)
left manifesto	-7,31	17,20	-32,52	11,97	53	Budge et al. (2001)
openness	-	-	-	-	-	Mitchell (2007a) Penn World Table
output gap	-	-	-	-	-	own calculation
prop1564	-	-	-	-	-	Mitchell (2007a)
prop65	-	-	-	-	-	Mitchell (2007a)

Table 3.17
Variables' sources and statistics for France

	mean	max.	min.	std. sev.	obs.	source
government size	31,21	54,93	10,60	15,12	124	Andre and Delorme (1987) National Institute of Statistics and Economic Studies
income	7,68	22,29	1,90	6,36	138	Maddison's website. Historical Statistics of the World Economy, Table 2
inequality	3,58	9,39	1,63	2,16	84	Atkinson (2005)
labor share	76,14	98,47	60,17	5,82	113	Piketty's website
left dummy	0,41	1,00	0,00	0,49	132	see essay 4 of this dissertation
left ideology	0,45	0,86	0,11	0,21	137	see essay 4 of this dissertation
left manifesto	0,54	26,02	-16,67	10,00	52	Budge et al. (2001)
openness	-	-	-	-	-	Asselain and Blancheton (2005) World Bank
output gap	-	-	-	-	-	own calculation
prop1564	-	-	-	-	-	Mitchell (2007a)
prop65	-	-	-	-	-	Mitchell (2007a)

Table 3.18
Correlation matrix for the U.S.

	government size	labor share	income	left dummy	left ideology	left manifesto	inequality
government size	-	-0,32	0,87	-0,19	-0,27	0,74	0,29
labor share	-	-	-0,54	-0,12	0,11	-0,31	-0,57
income	-	-	-	-0,02	-0,14	0,79	0,63
left dummy	-	-	-	-	0,69	-0,05	0,28
left ideology	-	-	-	-	-	-0,01	0,23
left manifesto	-	-	-	-	-	-	0,62
inequality	-	-	-	-	-	-	-

Table 3.19
Correlation matrix for the U.K.

	government size	labor share	income	left dummy	left ideology	left manifesto	inequality
government size	-	-0,09	0,32	-0,16	-0,39	0,74	0,43
labor share	-	-	0,04	-0,10	0,14	-0,13	-0,45
income	-	-	-	0,28	0,29	0,54	-0,11
left dummy	-	-	-	-	0,81	-0,24	-0,16
left ideology	-	-	-	-	-	-0,34	-0,51
left manifesto	-	-	-	-	-	-	0,23
inequality	-	-	-	-	-	-	-

Table 3.20
Correlation matrix for France

	government size	labor share	income	left dummy	left ideology	left manifesto	inequality
government size	-	0,06	0,95	-0,07	-0,01	-0,44	-0,85
labor share	-	-	0,01	-0,18	-0,41	0,25	-0,33
income	-	-	-	-0,04	0,08	-0,48	-0,85
left dummy	-	-	-	-	0,78	-0,39	0,06
left ideology	-	-	-	-	-	-0,46	0,07
left manifesto	-	-	-	-	-	-	0,49
inequality	-	-	-	-	-	-	-

4. POLITICAL IDEOLOGY AND ECONOMIC GROWTH IN A DEMOCRACY: THE FRENCH EXPERIENCE, 1871 - 2004[1]

4.1 INTRODUCTION

For a few years, an increasing literature has focused on the economic consequences of individuals' social norms such as social capita and trust[2]. However, other essential social norms such individuals' political sentiments, also called political ideology, have received less attention. As proof, Sala-I-Martin et al. (2003) classified the 67 most common variables in the growth model literature, without referring to any explicit measure of political ideology. This seems even more surprising that the influence of partisan effect on various policies[3] as well as the growth effects of many policies, have been extensively studied. This lack of interest for the growth effect of political ideology can stem from the fact that political ideology is commonly assumed to affect business cycle and not the long-run trend of the economic growth. Indeed, as Alesina (1987) theoretically argues, the government's political ideology is supposed to affect short-term economic fluctuations through the citizens' expectations[4]. However, the institutional economics literature argues that ideology plays an essential role in long run performance through individual or public choice (North, 1990, 1992). Indeed, the individuals' political ideology can directly affect growth through informal institutions such as

[1] This essay is based on Facchini and Melki (2012).
[2] See Knack and Keefer (1997), Whiteley (2000), Durlauf (2002), Zak and Knack (2001), Beugelsdijk et al. (2004).
[3] See Imbeau et al. (2001) for a meta-analysis on the effects of political ideology on various policies.
[4] Concerning the empirical literature, Alesina (1988) shows that in the United-States, Democrats perform better during the early years of the term, as they implement monetary and expansionist budget policies not immediately expected by voters. Alesina et al. (1997) confirm this finding with panel data OECD data for the period 1960-1993. Dubois (2005) finds for France in the post-1979 period that the GDP growth increases during the six quarters following the election of a left-wing government. In this line, recent works show that the governments' political ideology by itself matters for the expectations of financial markets (Snowberg et al., 2007) and for private consumption (Gerber and Huber, 2009).

culture and social norms in terms of labor and savings behaviours. The voters' ideology can also indirectly work on growth through the formal institutions embodied in policies for which they vote. Both effects are of course closely related since the formal institutions resulting from the electoral choices stem, at least partially, from the country's culture.

In this paper, we ask whether and how variations in voters' ideology, measured by the political affiliation of the parliament, have played a role in explaining economic growth. We investigate this question with time-series data on France for the period 1871-2004, covering the whole of the French democratic experience. Using as a main ideology index the composition of the Lower Chamber of the parliament, elected by the universal suffrage throughout the observation period, enables us to have a big picture of the ideological orientation of a society in a given time period. The purpose of the paper implies to investigate the transmission policy channels through which ideology impacts growth. As voters' ideology may be regarded as the society's choice concerning the appropriate level of government interference in the economy, we focus here on the size of government as a possible transmission mechanism between ideology and growth. Nevertheless, our point is not to determine immutable growth-enhancing policies than can be associated with right- or leftwing policies. Indeed, one can reasonably expect any policy to have different performance according to the environment, especially at the scale of a century.

The theoretical literature exploring the ideological long-term effects with equilibrium consequences is scarce. Benabou (2008) argues theoretically that societies can embrace ideologies leading to equilibrium associated with inappropriate public responses to market failures. In his model, citizens can adopt an inefficient leftist ideology, voting for an excessively large government or a laissez-faire ideology with blind faith in the invisible hand. Bjornskov (2005) provides a theoretical framework supporting that people with a strong merit assumption (thinking that inequality is fair and expecting high returns to effort) are more productive and thus directly foster economic performance. In addition, people with such an assumption votes for rightwing parties promising stronger legal systems, thus indirectly boosting economic growth. Another strand of the literature focuses more specifically on the relationship between voters' ideology and redistributive policies[5].

To the extent that voting behaviour is a proxy for voters' social norms, the level of government intervention in the economy is an ideal transmission mechanism to study the indirect effect of voters' ideology on growth. Indeed, most studies on ideology assume and

[5] See Piketty (1995), Benabou and Ok (2001), Saint-Paul (2010).

provide consistent supports that more leftwing voters or societies wish higher levels of government intervention. In this context, the endogeneous growth theories provide useful predictions regarding the growth effect of government intervention. While excessive government intervention is typically found to be detrimental to growth (Barro, 1991), investment in protection of property rights lead to higher growth (Hann and Sturm, 2000). However, redistribution can reduce the private incentive to accumulate capital and to invest. On the other hand, public investment, creating positive incentives for the private sector, has a positive effect on growth, as documented by the empirical literature (Romp and De Hann, 2007). In this study, we approximate the level of government intervention by the size of government measured by the share of total public spending in GDP.

Among the few empirical evidence of an ideological effect on growth, Bjornskov (2005) initially uses panel data for the period 1970-2000 to show that countries to the right of the average experience more growth, especially thanks to better legal systems and less government intervention.[6] Accordingly, using panel data, Bjornskov (2008) provides evidence that the higher the income inequalities are, the more a government shift to a right-wing ideology improves growth.[7] On the contrary, Osterloh (2012) using similar data, provides evidence for the absence of growth effect of an aggregated index of ideology. However, he shows that parties with preferences corresponding with market intervention and welfare state policies impacts on growth negatively. Most of the empirical research on the effects of political ideology has in common to use time-varying ideology indexes based on the parties' manifesto. In this regard, our paper differs from the existing literature in that we study the effect of ideology measured by the actual composition of the parliament, according to the right-left divide of the moment. Such a measure has the advantage to avoid an ex-ante definition of the right and the left. We do not need here to associate a certain group of parties (left or right) with certain sets of policies. Indeed, in all bi-party democracies, one can clearly identify a right and a left at any period of time while it is impossible to define ex-ante the content of a rightwing (/leftwing) policy. However, the manifesto-based ideology indexes has admittedly the advantage to account for the time varying ideology. In this paper, we cope this issue by allowing our index to have different effects in different periods. For that we use interaction between our ideology index and time dummies for periods in which one could

[6] The countries ranked as right-wing experienced 0.25% additional growth per year compared to the left-wing ones (Bjornskov 2005, p.140).

[7] At the mean inequality level, a move from a center to a center-right government is associated with a .28 percentage points increase in the annual growth rate (Bjornskov 2008, p.306).

reasonably expect the ideological divide to have changed. In this view, our approach is complementary to the research based on manifesto indexes and provides additional insights on the topic.

By investigating the growth-ideology relationship, this paper is also inevitably related to the literature studying the effects of economic fluctuations on policy sentiments, i.e. voting along a left-right axis (see Durr, 1993; Stevenson, 2001; Markussen, 2008). This literature consistently claims that policy sentiments shift leftwards when the economy is prospering and to the right during recessions. This leads us to take seriously the identification issue between political ideology and economic growth. Until now, the empirical literature has not provided appropriate instrumental variables for political ideology, except Bjornskov and Potrafke (2012) who use government employment as an instrument to study the effect of ideology on economic freedom. In this paper, we propose an appropriate econometric methodology to cope with a possible endogeneity bias and determine appropriate instruments for ideology.

Our time series-analysis covering 130 years departs from the existing literature studying the effects of political ideology. Indeed, the literature is mainly composed of cross-sectional studies that focus on a group of countries or regions inside a country. As a consequence, we avoid the main difficulties inherent to these studies. The first one stemming from fairly short observation periods that generally do not exceed 25 years (Potrafke, 2012). The second one is related to the delicate measure of the cross-national differences of the right- and leftwing ideologies.[8] In their meta-analysis, Imbeau et al. (2001) notice that partisan effects would be too subtle to ensure sufficient robustness of cross-sectional statistical estimations.

In this paper, we provide empirical support that rightwing majorities in parliament experience more economic growth than leftwing majorities all over the period 1871-2004. The long run effect of a switch from a totally leftwing parliament to a totally rightwing one is an increase in the GDP growth rate of 1.20%. The growth effect of political ideology is robust when splitting the sample period into two subperiods before and after the Second World War. The use of Granger causality and 2 SLS methods makes us confident that the flaw of causality is running from political ideology to economic growth. We find evidence that government intervention in the economy, approximated by government size, is the transmission channel through which ideology impacts growth for the post-war period but not for the pre-war period. Far from denying the evolution of right- and leftwing parties since 1945 and a fortiori

[8] Using the Database Political Institutions (DPI) (Beck et al. 2001), the ideology index of suspiciously shows that France is perceptibly more right-wing than the U.S. between 1975 and 2000 (Bjornskov, 2005, p.144).

since 1870, we thus provide evidence that the level of government intervention is an issue that has structured the right-left ideological divide in France for the post-war period.

The paper is structured as follows. Section 2 presents the data and the empirical strategy. Section 3 presents the results. Section 4 concludes.

4.2 DATA

4.2.1 THE IDEOLOGY INDEXES IN THE LITERATURE

The empirical research on the growth effect of political ideology provides some measures of ideology mainly based on the parties' manifesto. Bjonrskov (2005, 2008) employs the categorization by Beck et al. (2001) based on the parties' names and platforms[9]. As numerous researches of the effects of political ideology, the index used by Osterloh (2012) comes from the Manifesto Research Group (MRG) data of Budge et al. (2001). Based on the content analysis of party manifestos, the MRG data provides an index for each party according to numerous policy issues, identifying time-variant party preferences. Given that the political platforms of rightwing (/leftwing) parties evolved through time, a rightwing (/leftwing) party of the 1950s can be classified by the MRG as more leftwing (/rightwing) than a leftwing (/rightwing) party of 1980s. This classification has admittedly the advantage to account for the time varying ideology of parties but disregards the real political divide that structured the political landscape of a country at any point of time.

Moreover, the construction of such manifesto-based indexes require ex ante assumptions on what rightwing and leftwing policies are. As a consequence, the endogeneous construction of these indexes allows to study a priori the transmission channels between ideology and growth. However, we seek here to determine a posteriori these channels, with an ideology index independent of its potential channels. Under the assumption that the MRG data reflects properly the parties' preferences for specific policies[10], research on the growth effects of this

[9] Beck et al. define the largest government party according to whether they have a leftwing, centrist or rightwing political orientation.

[10] One cannot totally discard the hypothesis that manifestos are strategically written texts, which possibly not reflect the party's ideology. However, the empirical literature supports that, for at least some dimensions, policy preferences of governments derived from party manifestos are correlated with policy actions after the election (see Budge and Hofferbert (1990) for some expenditure categories, Bräuninger (2005) for public expenditure, Quinn and Toyoda (2007) for international capital account regulation). In this context, research on the effects of such an index comes to studying the ability of the index to explain the actual political choices.

index comes to study the economic performance of some policies, making the focus on ideology in itself secondary.

4.2.2 BUILDING AN IDEOLOGY INDEX FOR FRANCE SINCE 1870

First, it should be stressed that a measure of ideology makes sense only if elections are democratic so that voters can reveal their true preferences. The French case provides one of the longest stable democratic periods since the establishment of the 3rd Republic in 1870, which was briefly interrupted by the Vichy regime (1940-1945) during World War II[11]. For these reasons, our study starts in 1871[12], date of the Constituent Assembly election and excludes the non-democratic Vichy period. We also exclude the World War I period that corresponds to an unusually situation gathering both right- and leftwing parties in the *Union Sacrée* government. Given that the Lower Chamber of the parliament is the sole political institution elected by the universal suffrage throughout the period 1870-2004, our ideology index focuses on the composition of this Chamber[13]. In this regard, our index reflects the voters' political ideology and culture.

Another important prerequisite for the building of an ideology index is the existence and a permanence of a right- left ideological divide. As the right-left divide originates in France in the wake of the French Revolution, this divide is already firmly established and structured the political landscape in 1870. The permanence of this divide all along our period has been subject to much debate among historians and analysts of the French political life[14]. It appears from this debate that two trends have cohabitated all along the French democratic experience: on the one hand, the variety and the diversity of the political groups and parties and, on the

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[11] Historically, France was the first European country to introduce universal male suffrage in 1848. After having experienced, in the wake of the French Revolution, two empires, three constitutional monarchies and two attempts of Republic, France adopted *de facto* in September 1870 a parliamentary republic with the Third Republic (1870-1940).

[12] The regime was only really established in 1875 with the adoption of the *Wallon Amendement* (constitutional bill) and the constitutional laws. The National Assembly was and still is split in two chambers: an Upper one, the Senate and a Lower one, the House of Deputies, which is the sole institution elected by direct universal suffrage.

[13] An additional reason to focus on the Lower Chamber is that the Third Republic leaves almost no room for the executive power, being qualified the "Republic of deputies" (Goguel 1946). This bicameralist system characterizes the functioning of the French democracy until now, with the exception of the Vichy Regime. The Forth Republic (1946-1958) followed upon the previous one with roughly the same institutions. But under the Fifth Republic (1958-nowadays), the Parliament is composed of the Senate and the National Assembly, which became the Lower Chamber. By consequent, after 1958, we focus on the National Assembly to characterize the parliament's political affiliation.

[14] The most emblematic authors that deny a connection among the rights and the rights are Aron (1957) and Rémond (1963) although the latter acknowledges that the tendency among historians is to underpin the thesis of a continuity or a gist of the lefts and the rights through time (Rémond 1963, p. 13-23). Mayer (1997, p.15) argues that the left-right divide seems to remain a touchstone in the French political landscape.

other hand, the dualism of the fundamental (right/left) tendencies (Goguel 1946, p.19). Historians such as Siegfried (1930) provideds striking examples of stability in the voting patterns and of the relative weight of the two main tendencies since 1871. Although noone can deny that this divide has evolved through time[15], it seems to have been permanently structured by certain economic issues such as public spending and public debt[16] (Fridenson 2005, p.587; Becker 2005, p.313).

Within this context, we build an ideology index measuring the parliament's political ideology on a yearly basis since 1871. This index is a continuous variable indicating the percentage of right-wing seats in the Lower Chamber. It is distributed between 0 and 1; 0 reflecting the absence of right-wing deputies, and 1, a Chamber totally filled with right-wing deputies. An immediate difficulty comes from the identification of the affiliation of a given party, especially as some of them, mostly from the left, moved from the extreme left to the centre-right over decades. To classify the various majorities, we use several sources provided by historians (see Table 4.10, Appendix). As the moderate parties participated in the formation of the majorities and was active inside these, they are assigned the affiliation of the government to which they belonged. Additionally, we do not include in our index the few independent deputies, the *"Non-Inscrits"*, after having verified that their presence would not influence the colour of the majority. Furthermore, for the data on election years, during which the majority in the parliament may shift, we consider the composition of the outgoing Chamber, that is to say the percentage of right-wing deputies before the election. Figure 4.1 presents the index. Left-wing parties governed for 79 years, as compared to 55 years for right-wing ones. The mean of the index is 0.44 showing that the parliament is slightly more leftwing on the observation period and the standard deviation is 0.21.

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[15] The continuity of this divide is not that obvious for the early years of the French democracy. Indeed, during the first three decades of the Third Republic, until the "*Ralliement*" of the Church to the Republic in 1898, the main ideological opposition was between a republican left in favour of a republican regime and secularization and a conservative right supporting a monarchist and religious government system.

[16] In 1871, left and right were already opposed upon the debt due to the cost of war against Prussia (1970-1971) and *La Commune* (1871) and of the colonial strategy (Fridenson 2005, p.587; Becker 2005, p.313). As early as the 1870's and especially since Waldeck-Rousseau's government in 1899, the left developed its main issues (Duclert 2005, p.211) such as the regulation of working time and working conditions, wealth redistribution through tax and the denunciation of the « *mur de l'argent* ». Even though some leftwing governments such as Combes's one or the "*Bloc des gauches*" are often presented as socially shy (Candar 2005, 223), all the main laws on labor market (minimum wage, working time regulation and more generally labor market entrance and exit conditions) were adopted by lefty majorities in parliament. The left seems to have been rather in favor of nationalization of certain strategic public sectors, redistributive policies likely to decrease inequalities (Fridenson 2005, p.592 – 589) and a strict regulation of freedom of contract.

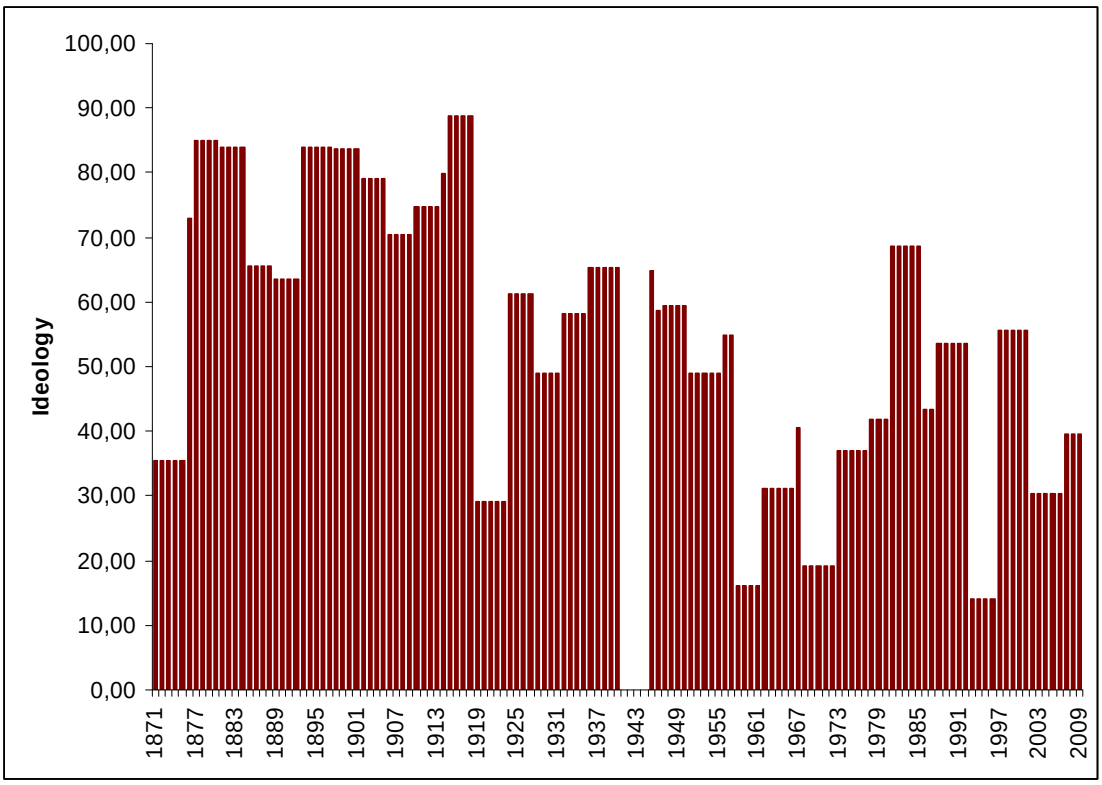

Fig. 4.1
Evolution of the Ideology index for the French parliament from 1871 to 2009

Nonetheless, it is important to verify to what extent results obtained with alternative measures of ideology can differ. For that, we first construct a dummy variable coded 1 when the majority in the Lower Chamber is rightwing and 0 otherwise. While this alternative measure provides general information on the parliament's affiliation, our main index seems more suitable to study the policy channels from ideology to growth. Indeed, as most bills are voted on by qualified majority, our main index, measuring the size of the majority, can capture the fact that a strong majority could more easily implement its favourite policies and thus strengthening its growth effect. Second, as in reality there are substantial lags between preferences, as expressed in the ideology index, and policy enacted by government, we also use a moving average of the previous ten years of our main index. Such a measure of ideology also provides a better proxy for the persistence of voters' ideology. Finally, for comparison purposes, we use an ideology index based on data coming from the Manifesto Reasearch group (MRG) data of Budge et al. (2001). This data is available for the period 1946-1997. Following Pickering and Rockey (2011), annual series are constructed for the median voter ideology position by weighting party ideologies according to their vote received. This is measured from -100 to +100 so that -100 is extreme left and 100 is extreme right.

4.2.3 SPECIFICATION ISSUES

In the following, all variables are considered in logarithm so that they first differences approximate their growth rates. The dependent variable is the growth rate of real GDP, from Maddison's website[17]. Figure 4.2 depicts the data. To our knowledge, Maddison's data is believed to be the most reliable source among the long-term data available for the French GDP. A comparison with the series provided by Toutain (1997), available from 1890, shows that the two series are highly positively correlated as expected.

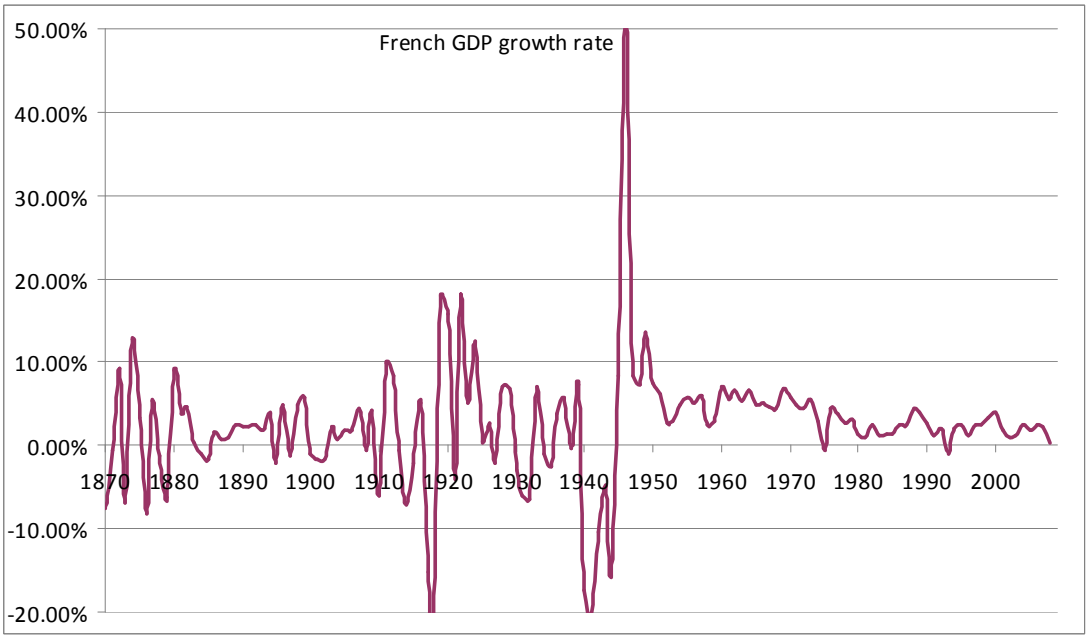

Fig. 4.2
French real GDP growth rate (1869-2009)

The time-series literature investigating the growth effect of government established a set of variables typically useful. Based on a Cobb–Douglas production function developed by Ram (1986), growth models commonly include the share of investment in real GDP, labor force, openness of the economy and the share of government expenditure in real GDP. In our empirical analysis, investment is given by the gross domestic capital formation as percentage of GDP and the main source used is Maddison's website[18]. The labor force represents the

[17] http://www.ggdc.net/MADDISON/oriindex.htm
[18] http://www.ggdc.net/MADDISON/oriindex.htm

average annual hours actually worked and mainly provides from Cette et al. (2009). Openness is the percentage of the sum of importations and exportations in total GDP and is provided by Asselain and Blancheton (2005). The share of government expenditure, that we call government size, measures the total public spending (central state, social protection and local public authorities) in total GDP and is constructed by linking André and Delorme (1987) and the series of the National Institute of Statistics and Economic Studies (INSEE). All variables used in this analysis are extensively described in Table 4.10 in Appendix.

While these variables generally enter the regressions in growth rates or in first differences in time-series analyses[19], the literature is divided on whether government size, should enter the regression in level or in growth rate. While Ram (1986) argues theoretically for the use of the growth of government size in the growth models, he acknowledges that specifications can include the variable in level, as initially did by Landau (1983). Among others using time-series data[20], Kocherlakota and Yi (1996) derive certain time-series properties implied by endogeneous growth theories, arguing for the use of government size in level in the growth models[21]. One implication is that temporary changes in government policies can have temporary effects of output growth but permanent effects on output levels.

As our purpose is to investigate the long run growth effect of government, our model includes government size in level. However, as government size is an ideal candidate as a transmission channel between ideology and output growth, the presence of this variable in the specification could hide the potential indirect effect of ideology on growth. Thus our baseline specification excludes government size and includes investment, labor, openness and the oil price, an important control especially for the post second war period (Perron, 1989)[22]. We estimate a second specification including our ideology index in level into the baseline specification. Then, to perform a miniature sensitivity check of the impact of ideology and explore the transmission mechanisms, we include government size along with the ideology index into the baseline specification. Finally, the lagged dependant variable is systematically included as a regressor because of the possible persistence in economic growth and of

[19] We use these variables in log-first differences, which make the series stationary and enables us to avoid any concerns of spurious regressions with variables integrated of different order. Indeed, it is an establisged result in the growth literature that these variables are stationary in first differences.
[20] See for instance Jones (1995), Evans (1997), Kocherlakota and Yi (1997).
[21] However, the use of the level government size along with variables in first difference that are stationary or I(0), can produce spurious regressions if government size is not I(0). Mittnik and Neuman (2003) justifies the use of the level government size by the fact, although unit root tests may support the hypothesis of non-stationarity, this variable cannot be integrated of order one, I(1), since it is somewhere between 0 and 1, by definition.
[22] Indeed, Perron (1989) showed the importance of the oil shocks in the trend of the U.S. output.

problems of serial autocorrelation. Given the presence of the lagged dependent variable in the specification, the estimates provide the current period (or short-run) impact of government size and ideology. The long run effect of these variables can be calculated by multiplying the point estimate by 1 / (1 - *b*), where *b* is the point estimate of the lagged dependent variable.

4.2.4 STRUCTURAL BREAKS

A concern inherent in time series analyses, especially covering a period of more than one century, is the possible structural break in our series. With the same data than used in this paper, Facchini and Melki (2011)[23] extensively explore this issue. They show that the year 1945 is a natural structural break for both the French real output and government size. They also provide evidence of a non-monotonic relationship between government size and real output, as a consequence for the present analysis that the relationship between ideology, government size and output growth may have evolved over time. To take into account the possible breaks in the relationship investigated, we employ three different methods. First, we reestimate our model including time dummies. A dummy for the post (second) war period is included, as well as dummies for the three different republics covering our observation periods. Indeed, one can reasonably expect the institutional setting inherent in each republic to have played a role. A second solution to investigate the changing effect of political ideology on growth is to add interactions between ideology and the republic dummies, in which one can expect that the political beliefs may have changed. A last solution consists in splitting the whole observation period into a pre- and post-war periods and reestimating our model for these subperiods.

4.2.5 REVERSE CAUSALITY BIAS

A final concern is that ideology may be endogeneously determined. Indeed, ideology may have deep cultural determinants, such as historical, legal or sociological factors. However, such variables are in large part highly persistent and the analysis here controls for the (political) institutions. We also estimate a specification including socio-demographic variables. Moreover, our inclusion of the lagged dependent variable further mitigates these concerns. However, ideology can also be influenced by short-term economic fluctuations, as

[23] This paper corresponds to chapter 2.

illustrated by Markussen (2008). Indeed, he theoretically argues that the median voter's ideology shifts leftwards when the economy is prospering because when he feels that he is getting richer, he also demands more insurance. We employ two strategies to cope with this issue. Following Pickering and Rockey (2011), the use of the 10-year moving average of our ideology index can lessen concerns about endogeneity since the ideology measure substantially predates the observations of output growth. However, this kind of Granger causality does not imply true causality because it remains possible that a third dynamic drives both ideology and economic growth. As a consequence, we also adopt a 2 SLS estimation of our model by instrumenting ideology with the socio-economic variables provided by Markussen to explain political ideology and the government employment uses as an instrument by Bjornskov and Potrafke (2012).

4.3 RESULTS

4.3.1 OVERALL RESULTS

At first sight, the French economic growth seems to be higher under the legislatures with a right-wing majority in the parliament over the period 1871-2004. In fact, on average, the growth rate under a right-wing majority at the Lower Chamber is almost 4% while it is 2.4% under a left-wing one. However, this insight needs to be empirically tested to conclude on its robustness. Consequently, we estimate the effect of ideology in a standard setup for the whole sample period 1873-2004. Column 1 of Table 4.1 reports the results of estimating the baseline model without political ideology nor government size, which deserves a few comments. First of all, the growth rate of the investment share and of openness are statistically significant and positive, which conforms to standard assumptions. However, the variations in labor and oil price never attain significance. The absence of effect of the labor variable is not an unusual result in the literature (see for instance Roy, 2009). Moreover, it is unlikely that oil prices affected the French economic growth before the Second World War, which explains the absence of significance of oil price in this battery of tests. So, despite these reservations the model does a good job explaining annual growth performance, as the fit and explanatory power is satisfactory.

Turning to the question of the paper, political ideology indeed seems to contribute to growth. In column 2, the coefficient of ideology is statistically significant at 5%, which can be considered more than satisfactory given the crudeness of the measure. Although little

emphasis should be put on the size of the estimate, it suggests that a rightwing ideology has a positive and statistical significant effect on economic growth. Given the presence of the lagged dependent variable, the parameter estimates reflect the current period (or short-run) impact on economic growth of the explanatory variables. Thus the impact of ideology on the long-run steady-state level of growth can be calculated from the coefficient of the lagged dependent variable and yields the coefficient 0,012. To interpret this coefficient, consider an archetypal parliament full of leftwing deputies compared to an archetypal parliament full of rightwing deputies. If we take the switch from an archetypically leftwing parliament to an archetypically rightwing one, then the long-run impact of this switch is an increase in the GDP growth rate of 1.20%, all else equal. As a comparison, we run the same regression with an alternative measure of ideology, given by a dummy variable, right dummy. Column 3 shows that this measure of ideology does not reach any reasonable level of significance. This implies that, more than the mere affiliation of the parliament's majority, the size of the majority matters. This can also suggest that the growth effects of ideology is mediated by policies voted in the parliament.

Columns 4-5 test whether this result is stable to the inclusion of government size that could proxy for a transmission mechanism. Column 4 includes only government size in the baseline specification. This variable is not statistically significant, thus seeming not to be a relevant transmission mechanism. This is confirmed in column 5 when including both the ideology index and government size in the regression. Indeed, including government size has the effect of increasing the magnitude and the significance of the ideology variable. This can be explained by the fact the growth effect of ideology is not mediated by the size of government but also by a changing relationship between government size and economic outcome, as suggested by the non linearity hypothesis between government size and output[24].

[24] For a literature review, see Facchini and Melki (2011), which corresponds to essay 2.

Table 4.1
Economic growth and political ideology, 1873-2004

	Δ(real GDP) 1873-2004				
	(1)	(2)	(3)	(4)	(5)
constant	0.025***	0.035***	0.015	0.009	0.061**
	(0.002)	(0.005)	(0.017)	(0.015)	(0.025)
Δ(lag. real GDP)	0.121**	0.105*	0.115**	0.117**	0.105*
	(0.047)	(0.054)	(0.051)	(0.049)	(0.055)
Δ(investment)	0.240***	0.236***	0.241***	0.243***	0.230***
	(0.039)	(0.038)	(0.038)	(0.039)	(0.036)
Δ(labor)	0.289	0.357	0.2941	0.304	0.366
	(0.309)	(0.317)	(0.324)	(0.313)	(0.320)
Δ(openness)	0.286***	0.270**	0.282**	0.277**	0.275**
	(0.105)	(0.112)	(0.110)	(0.107)	(0.113)
Δ(oil price)	-0.008	-0.009	-0.009	-0.009	-0.009
	(0.012)	(0.011)	(0.012)	(0.012)	(0.011)
right ideology	-	0.011**	-	-	0.015**
		(0.004)			(0.007)
right dummy	-	-	0.005	-	-
			(0.006)		
government size	-	-	-	0.004	-0.006
				(0.004)	(0.005)
R^2	0.675	0.693	0.677	0.678	0.696
Observations	118	118	118	118	118

Notes: (1) The observation sample excludes the war years. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (4) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

4.3.2 ADDITIONAL CONTROLS

To control for the potential structural break in the relationship, we include time dummy variables in the model with ideology and government size. Column 1, Table 4.2 shows the estimate results of the specification including ideology, government size and a dummy for the post-second war period. The effect of right ideology is robust when including a post-war dummy but government size turns out to be negative and significant at the 1% level. This tends to confirm the changing growth effect of government size over our sample period. Controlling with time dummies for the republics provides the same conclusion, as shown in column 2. This also supports the hypothesis that ideology impacts economic growth

independently of the growth effects of each republic. This suggests a stable relationship between ideology and growth over the sample period. Controlling for a set of persistent demographic variables, such as the dependency ratio, the share of active population in total population and the tertiary enrolment as well as for electoral years confirm the significantly positive and negative effects of ideology and government size, respectively (column 3). The absence of significance of electoral year shows that the growth effect of ideology that we find is not due to the arrival of a new government that artificially boosts output.

Another way to tackle the issue of a changing effect of ideology over our period, we estimate the effects of interaction variables between our ideology index and the three republics, first without including government size in the regression. Column 1, Table 4.3 shows a positive and significant effect of the interactions variables for the 3rd and the 5th Republic, while the interaction with the 4th republic does not reach significance. As the 4th republic represents only a decade in a sample period of 130 years, we can be rather confident in the stability of the effect of ideology on growth. However, including government size into this specification alters the qualitative results regarding the interaction terms. Indeed, as shown in column 2, the interaction term with the 5th Republic is no longer significant while the interaction with the 4th Republic reaches the 10% significance level and is negative. This suggests that government size could be a relevant transmission channel for the post-war period and especially during the 5th Republic.

Table 4.2
Economic growth and political ideology, 1873-2004

	Δ(real GDP) 1873-2004		
	(1)	(2)	(3)
constant	0.150*** (0.037)	0.177*** (0.049)	0.172*** (0.053)
Δ(lag. real GDP)	0.070 (0.047)	0.043 (0.052)	0.040 (0.056)
Δ(investment)	0.225*** (0.034)	0.214*** (0.034)	0.211*** (0.036)
Δ(labor)	0.162 (0.287)	0.307 (0.274)	0.342 (0.310)
Δ(openness)	0.240** (0.093)	0.242*** (0.088)	0.242** (0.093)
Δ(oil price)	-0.009 (0.011)	-0.008 (0.010)	-0.006 (0.011)
right ideology	0.016** (0.006)	0.018*** (0.006)	0.018*** (0.006)
government size	-0.039*** (0.012)	-0.031** (0.013)	-0.030** (0.014)
Δ(prop65)	-	-	0.146 (0.293)
Δ(prop15_64)	-	-	-0.048 (0.191)
Δ(tertiary_enrollment)	-	-	0.007* (0.004)
elecloral year	-	-	0.003 (0.005)
post WWII dummy	0.039*** (0.014)	-	-
republic dummy	-	yes	yes
R^2	0.732	0.744	0.748
Observations	118	118	115

Notes: (1) The observation sample excludes the war years. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (4) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

Table 4.3
Economic growth and political ideology, 1873-2004

	Δ(real GDP) 1873-2004	
	(1)	(2)
constant	0.040***	0.169***
	(0.006)	(0.038)
Δ(lag. real GDP)	0.036	0.021
	(0.054)	(0.051)
Δ(investment)	0.235***	0.217***
	(0.034)	(0.032)
Δ(labor)	0.247	0.309
	(0.256)	(0.237)
Δ(openness)	0.250***	0.2547***
	(0.086)	(0.076)
Δ(oil price)	-0.008	-0.002
	(0.011)	(0.009)
government size	-	-0.036***
		(0.001)
right ideology*3rd republic	0.014***	0.034***
	(0.004)	(0.007)
right ideology*4th republic	-0.015	-0.015*
	(0.010)	(0.009)
right ideology*5th republic	0.018**	0.002
	(0.008)	(0.008)
R^2	0.774	0.801
Observations	118	118

Notes: (1) The observation sample excludes the war years. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (4) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

4.3.3 TACKLING THE REVERSE CAUSALITY BIAS

As noted above, a potential concern in this analysis is that ideology may be endogeneous. As ideology is supposed to be mainly affected by long run determinants, controlling for such determinants partially alleviate possibilities of reverse causality. That is what we did in the previous set of regressions when controlling for republics and demographic variables.

Another way of tackling this issue is to estimate the model by taking the moving average of our ideology index. Column 1, Table 4.4 provides the estimate results of this specification. With such a measure, the magnitude and significance of the ideology is even strengthened, thus supporting that ideology Granger causes output growth and that the ideology effect is a long-run one, through persistent social norms. Finally, we turn to a 2 SLS estimation method by investigating the traditional variables explaining ideology as potential instruments. The result of the first stage of the 2SLS estimate is provided in Table 4.5. The variation in the dependency ratio and in immigration appears as good instruments. However, unlike Markussen (2008), economic factors such as unemployment do not affect ideology with our data. The estimate result of the second stage is provided in Table 4.4, column 2 and shows that the coefficient of ideology is robust compared to the previous OLS estimates. All this makes us confident about the absence of endogeneity in the relationship studied.

Table 4.4
Economic growth and political ideology, 1873-2001 – OLS and 2SLS second-stage estimates

	Δ(real GDP) 1873-2001	
	(1) OLS	(2) 2SLS
constant	0.098***	0.038***
	(0.028)	(0.006)
Δ(lag. real GDP)	0.126***	0.095**
	(0.045)	(0.043)
Δ(investment)	0.226***	0.242***
	(0.037)	(0.032)
Δ(labor)	0.159	0.449*
	(0.268)	(0.255)
Δ(openness)	0.284***	0.265***
	(0.095)	(0.069)
Δ(oil price)	-0.021**	-0.008
	(0.010)	(0.010)
right ideology	-	0.013**
		(0.005)
right ideology average	0.028***	-
	(0.007)	
government size	-0.014**	-
	(0.006)	
R^2	0.717	0.702
Observations	110	110

Notes: (1) The observation sample excludes the war years. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (4) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

Table 4.5
Political ideology, 1873-2001 – 2SLS first-stage estimates

	right ideology 1873-2001
	2 SLS
constant	-1.523***
	(0.078)
Δ(investment)	-0.314
	(0.481)
Δ(labor)	-7.682*
	(3.924)
Δ(openness)	-1.334
	(1.032)
Δ(unemployment)	-0.078
	(0.192)
Δ(self employment)	-0.152
	(0.282)
Δ(life expectancy)	-0.902
	(18.19)
Δ(tertiary_enrollment)	-0.164
	(0.267)
Δ(strike)	0.005
	(0.027)
Δ(age)	0.325
	(8.620)
Δ(prop65)	14.27***
	(0.008)
Δ(prop15_64)	7.145*
	(3.887)
Δ(immigration)	21.11***
	(3.341)
republic dummy	yes
R^2	0.624
Observations	111

Notes: (1) The observation sample excludes the war years. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (4) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

4.3.4 RESULTS FOR SUBPERIODS

We now turn to the analysis of the growth-ideology relationship for the pre- and post-war subperiods. Table 4.6 provides the estimates results for the pre-war period 1873-1938. The baseline specification does not include oil price that is not relevant for this subperiod. Column 1 shows that influence of right ideology is positive and statistically significant at the 1% level. Column 2 shows that when government size is included in the specification without ideology, it has a positive influence of government size but that reaches only the 10% significance level. When including both variables in the model, the effect of ideology is robust while government size does not reach any reasonable level of significance. This set of regressions support our previous intuition of a growth effect of ideology that is not mediated by the public spending channel for this period.

Table 4.7 provides the estimates results for the post-war period 1947-2004. When ideology alone is included in the baseline specification, it has a positive and significant influence on output growth (column 1). For comparisons purposes, we run the same regression with alternative measure of ideology. For this subperiod, the dummy variable of ideology has a positive effect and reaches the 5% significance level (column 2). However, when using the manifesto-based index built from the MRG data available for the period 1947-1997, ideology does not impact growth (column 3). That justifies the use of our index of ideology that does not associate a priori the right and the left with typical growth-enhancing policies whose effects can have evolved though time. When interacting our main ideology index with the dummies for the 4^{th} and the 5^{th} Republic, we find again the significant positive effect of right ideology for the 5^{th} Republic and the absence of effect during the 4^{th} Republic (column 4).

Table 4.6
Economic growth and political ideology, subperiod 1873-1938

	Δ(real GDP) 1873-1938		
	(1)	(2)	(3)
constant	0.084*** (0,014)	-0.059 (0,050)	0.075 (0,056)
Δ(lag. real GDP)	-0.080 (0,077)	-0.0005 (0,087)	-0.083 (0,080)
Δ(investment)	0.173*** (0,044)	0.221*** (0,049)	0.173*** (0,045)
Δ(labor)	1.808*** (0,535)	1.156* (0,614)	1.839*** (0,572)
Δ(openness)	0.288** (0,123)	0.294** (0,142)	0.285** (0,126)
right ideology	0.041*** (0,009)	-	0.041*** (0,010)
government size	-	0.031* (0,018)	0.002 (0,017)
R^2	0.768	0.697	0.7687
Observations	60	60	60

Notes: (1) The observation sample excludes the war years. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (4) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

Table 4.8 investigates the transmission mechanisms for the post-war period. As a comparison, column 1 reports the estimates result including ideology in the baseline specification. When government size alone is added to the baseline specification, it has a significant and negative effect (column 2). This result is in line with the non-linearity hypothesis that emphasises an inverted U relationship between government size and output. Thus France could be on the downward portion of its curve in the post-war period. When ideology and government size enters the same specification, this has the effect of rendering political ideology insignificant (column 3). In consequence, there seems to be some evidence that the effect of political ideology may run through public spending in the economy. To further investigate the public spending transmission mechanism, Table 4.9 explores the effect of ideology on government size for the post-war period. We use the comprehensive

specification of Facchini, Melki and Pickering (2012b)[25] investigating the determinants of government size in democratic countries, including France, all along the 20th century. According to their finding, government size proves to depend on political ideology for the post-war period. Indeed, right ideology has a negative and statistical significant impact on government size, as shown in Table 4.9. This last result definitely supports the hypothesis that government size has been a transmission channel from ideology to output growth for the post-war period. While our investigation leaves unanswered the transmission mechanisms between ideology and growth before the Second World War, we provide evidence that the rightwing parliaments fostered output growth by limiting the size of the government during the post-war period.

[25] This article corresponds to Chapter 3. The specification estimated here is based on the specifications used in Persson and Tabelilini (2003) and includes additional controls. The specification estimated in Table 4.9 includes the labor's share in the total value-added from Piketty (2006), the real GDP per capita from Maddison's website, income inequality from Atkinson (2005), the output gap given by the deviation of aggregate output from its trend value calculated from data from Maddison's website, prop1564, prop65 and openness.

Table 4.7
Economic growth and political ideology, subperiod 1947-2004

	Δ(real GDP) 1947-2004			
	(1)	(2)	(3)	(4)
constant	0.054*** (0.007)	0.036*** (0.005)	0.042*** (0.006)	0.036*** (0.004)
Δ(lag. real GDP)	0.151*** (0.041)	0.168*** (0.041)	0.167*** (0.048)	0.136*** (0.041)
Δ(investment)	0.168*** (0.051)	0.157*** (0.052)	0.150** (0.056)	0.168*** (0.050)
Δ(labor)	-0.037 (0.244)	0.065 (0.239)	0.312 (0.280)	-0.027 (0.241)
Δ(openness)	0.284*** (0.058)	0.302*** (0.058)	0.282*** (0.065)	0.267*** (0.057)
Δ(oil price)	-0.018* (0.010)	-0.018* (0.010)	-0.013 (0.013)	-0.017* (0.009)
right ideology	0.017** (0.007)	-	-	-
right dummy	-	0.008** (0.004)	-	-
right ideology manifesto	-	-	-2.42E (0.0003)	-
right ideology*4th republic	-	-	-	-0.007 (0.008)
right ideology*5th republic	-	-	-	0.018** (0.007)
republic dummy	yes	yes	yes	-
R^2	0.714	0.705	0.689	0.721
Observations	58	58	51	58

Notes: (1) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (2) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (3) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

Table 4.8
Economic growth and political ideology, subperiod 1947-2004

	Δ(real GDP) 1947-2004		
	(1)	(2)	(3)
constant	0.054***	0.391***	0.389***
	(0.007)	(0.039)	(0.042)
Δ(lag. real GDP)	0.151***	0.046	0.046
	(0.041)	(0.029)	(0.030)
Δ(investment)	0.168***	0.159***	0.159***
	(0.051)	(0.033)	(0.034)
Δ(labor)	-0.037	-0.049	-0.054
	(0.244)	(0.152)	(0.161)
Δ(openness)	0.284***	0.220***	0.221***
	(0.058)	(0.038)	(0.039)
Δ(oil price)	-0.018*	-0.007	-0.007
	(0.010)	(0.006)	(0.006)
right ideology	0.017**	-	0.0005
	(0.007)		(0.005)
government size	-	-0.096***	-0.095***
		(0.010)	(0.012)
republic dummy	yes	yes	yes
R^2	0.714	0.878	0.878
Observations	58	58	58

Notes: (1) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (2) We control for the outliers with annual dummy variables. A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (3) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

Table 4.9
Government size and political ideology, subperiod 1948-1998

	government size 1948-1998
lag. government size	0.503***
	(0.126)
right ideology	-3.456***
	(1.213)
R^2	0.985
Observations	51

Notes: (1) The specification estimated includes important controls not reported in the table: a constant, real GDP per capita, labor share, income inequality, prop15_64, prop65, openness, output gap and annual dummy variables for the outliers. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) A Jarque-Bear test is systematically performed to make sure of the normality of the error terms. (4) A Box-Pierce test is performed to make sure of the absence of serial auto-correlation.

4.4. CONCLUSION

This paper has asked whether differences in political ideology lead to differences in economic performance in France. It is a first attempt to investigate this issue with time-series data, covering a period of more than one century. Quite surprisingly, our finding regarding the effect of ideology on growth is consistent with the few panel studies investigating the issue for post-1970 periods. We also provide evidence in line with the existing literature regarding the transmission channel of government intervention since rightwing governments experience less government involvement in the economy. However, this transmission mechanism should be carefully considered as the influence of political ideology on government size is insufficient to explain its growth effect all along the French democratic experience. The unexplained effect can stem from other policy channels such as labor regulation or by the individuals' social norms that could directly work on growth. Further research is required to investigate other possible transmission mechanisms so as to distinguish the indirect effect mediated by policies and the direct effect of social norms.

However, our work differs from the rest of the literature investigating immutable growth-enhancing policies typically associated with the left and the right. Indeed, as documented by an important empirical literature, we assumed here that the same policy can have varying growth effects depending on the context and therefore right(-left)wing parties can adopt different policies to promote growth at different periods of time. This assumption led us to use

a measurement of political ideology based on the historical right-left divide. We argued that such an ideology measure is suitable for the investigation of the growth effects of ideology and provided robust results regarding the ideology-growth relationship. This method should be regarded as a complement to the increasing investigations based on manifesto data.

APPENDIX

Table 4.10
Description and Source of Variables

Name	Defintion	Source
age	Average age of the total population	INED: Institut National d'Etudes Démographiques
elecloral year	dummy variable coded 1 for the years of election and 0 otherwise	-
government size	percentage of total public spending (central state, social protection and local public authorities) in total GDP	André and Delorme (1987) National Institute of Statistics and Economic Studies (INSEE)
immigration	percentage of foreigners in the total population	National Accounts - INSEE
investment	gross Domestic capital formation as percentage of GDP at current prices.	Maddison's website
labor	Average annual hours actually worked	Cette et al. (2009) OECD
life expectancy	life expectancy at birth	INSEE INED
oil price	crude oil price barrel. Real Constant 2005 dollars	http://www.ioga.com/Special/crudeoil_Hist.htp
openness	percentage of the sum of importations and exportations in total GDP	Asselain and Blancheton (2005) World Bank
post WWII dummy	dummy variable coded 0 before 1945 and 1 afterwards	-
prop15_64	percentage of population aged 14<age<65	Mitchell (2007)
prop65	percentage of population aged 65 and over	Mitchell (2007)
real GDP	annual gross domestic product in million 1990 international Geary-Khamis dollars	Maddison's website. Historical Statistics of the World Economy.
right dummy	dummy coded 1 for the years when the rightwing deputies have the majority in the Lower Chamber of the parliament	see: right ideology
right ideology	percentage of the right-wing deputies in the Lower Chamber of the Parliament (Chamber of Deputies for the 3rd and 4th Republic and National Assembly for the 5th Republic) excluding French overseas departments and territories	Website of the French National Assembly Laurent de Boissieu' s website Goguel (1946), Rémond (1963)
right ideology average	10-year moving average of right ideology	see: right ideology
right ideology manifesto	median voter ideology position by weighting party ideologies according to their vote received	Manifesto Reasearch group (MRG) (Budge et al., 2001)
self employment	percentage of self-employment including people working on their own account without help except for family workers	Flora et al. (1987) International Labour Organization (ILO)
strike	number of individual non-worked days	National Accounts - INSEE
tertiary enrollment	percentage of the number of students in universities in the total population	Mithcell (2007)
unemployment	unemployment rate	Villa (1994) INSEE
3rd republic	dummy variable coded 1 for the period 1871-1940 and 0 otherwise	-
4th republic	dummy variable coded 1 for the period 1946-1958 and 0 otherwise	-
5th republic	dummy variable coded 1 for the period 1959-2008 and 0 otherwise	-

Notes: (1) website of the French National Assembly : http://www.assemblee-nationale.fr/ (2) Laurent de Boissieu's website: http://www.france-politique.fr/laurent-de-boissieu.htm

5. WHAT MOVES POLITICAL IDEOLOGY? AN ECONOMIC ANALYSIS OF ELECTORAL VOLATILITY IN FRANCE SINCE 1889[1]

5.1 INTRODUCTION

Ever since the seminal work of Kramer (1971), a large body of literature on economic voting has explored the impacts of macroeconomic changes on incumbent support in elections. According to the hypothesis on government responsibility for national economic conditions, voters tend to punish or reward the incumbent on the basis of their economic performance. The responsibility hypothesis has been extensively debated by this volume of literature in order to discover which party, in a multi-party system with coalitions, is held responsible by voters and to what extent candidates of the governing majority could be considered as incumbents in different elections, such as local elections (Grier and McGarrity, 1998). As Nannestad and Paldam (1994) noted in their literature review, the responsibility pattern only makes sense for governments that actually rule – as in the case of the USA and the UK – but not for other countries where minority governments have little control over the economy. In the theory of economic voting, it is also implicitly assumed that economic factors affect only government popularity whereas the popularity of opposition parties is influenced by political factors, most often missing in models (Nannestad and Paldam, 1994, p. 218). In brief, the theory focuses on the voting pattern for only a few parties in government and, within this theoretical framework, no work investigates the possible impacts of the economy on the votes for other parties.

[1] This essay is based on a joint work with François Facchini.

For their part, political scientists have focused on the determinants of electoral instability of party system or total electoral volatility, measured as an index of the volatility of votes for all the parties from one election to another. This phenomenon has traditionally drawn considerable attention for at least three reasons[2]. First, electoral stability mirrors the process of conflict encapsulation and democracy institutionalization (Bartolini and Mair, 1990). Second, electoral volatility epitomizes the vitality or competitiveness of a political system, that is to say its ability to make possible new winning alternatives (Dassonneville and Hooghe, 2001). Third, electoral volatility reflects the emergence of a new kind of voter, independent of political parties, the 'swing voter' (Dalton, 2006). The few studies that have examined the impacts of economic conditions on total electoral volatility tend to assume that economic performances affect volatility through votes cast for the incumbent (Mainwaring and Zoco 2007; Nooruddin and Chiiber, 2008). Economic variables were included in the models only from the perspective of economic voting. Therefore they leave unanswered the question of whether economic conditions can entail other types of voting behaviours than economic voting and more generally the question of the voting patterns for non-governing parties.

The limitations of the theory of economic voting cause both an empirical and a theoretical problem. From an empirical perspective, the theory has received limited support and provides no clear answers (Alesina, Londregan and Rosenthal, 1993; Chappell and Suzuki, 1993; Anderson, 2007 for a critical analysis of the literature). Moreover, the theory accounts for only a limited part of electoral behaviour because, whatever the economics are, volatile voters represent only a limited part of the total electorate, for instance 50% for an advanced democracy like the French one (Cautrès and Muxel, 2009, p.46). From a theoretical perspective, by reducing the vote to its instrumental dimension, the theory of economic voting is unable to explain the inertia of voting patterns and votes for non-governing parties, to whom the responsibility hypothesis cannot be applied. Indeed, according to the theory, voters incur only economic costs when voting. They incur no psychological costs of self-contradiction of ideological inconsistency when changing their votes, for instance, from a rightwing to a leftwing party. Under these conditions, voters are never attached to a party in the sense that they do not need to justify their choice. The absence of 'justification costs'

[2] For empirical literature on electoral volatility in Western democracies, see : Bielasiak (2002), Mainwaring and Torcal (2006), Rose and Munro (2003), Shamir (1984), Dalton et al. (2000), Mair (2005), Drummond (2002), Birch (2003), Lachat (2007).

makes the cost of volatility nil for voters. On the contrary, taking into account all the costs of voting suggests that voting for the left when having voted for the right at the previous election is costly for voters and can thus lead them to avoid doing so even though they have an interest in it. Therefore, taking into account the 'justification costs' in voting theory allows a better understanding of how and when voters change their vote.

Faced with the limitations of the theory of economic voting, the present paper tries to explain change in voting pattern with a theory of ideological voting that takes into account the justification costs of voting. We interpret electoral volatility as a mirror of voters' ideological instability and attempt to explain it by economic or political events that modify the justification costs of voters' ideology. Ideological change can be accounted for by the revision of the previous patterns of interpretation that are not consistent in the face of new information. If new information refutes old ideologies, electoral volatility is fostered. Therefore, the article raises the following two questions. First, what are the determinants of electoral volatility? In other words, which events affect ideological change? Second, to what extent the determinants of total electoral volatility differ from the determinants of the punishment of the incumbent?

To address these issues, we use time-series data on 46 democratic elections that took place in France from 1889 to 2011, the longest period ever studied in multivariate analyses of electoral volatility. The French case is particularly relevant for at least three reasons. First, the study of electoral volatility requires a multi-party system with several non-governing parties. Most cases studied in the literature on economic voting have traditionally focused on the U.S. (Kramer, 1971; Mueller, 2003) and the U.K. (Goodhart and Bhanasali, 1970), two bi-party systems, and on Switzerland (Schneider, Pommerehne and Frey, 1981), where the government is systematically a coalition of all parties. Therefore the French multi-party system with an identifiable opposition appears an appropriate case for studying both economic voting and total electoral volatility. Second, France is particularly well-adapted for a time-series analysis, as it provides one of the longest stable democratic periods with the universal male suffrage adopted in 1848 and the establishment of the Third Republic in 1870. In fact, no study of electoral volatility exists on the very long run, except that by Bartolini and Mair (1990) on the period 1885-1985 for western democracies (but only after 1920 for France). Third, as Mair (1993, p.123) observed, adopting a long-term approach allows mitigation of some findings that would be relevant only for short and recent periods, such as the sudden increase in volatility since the 1970s. Therefore, this long-term approach is an opportunity to take part in the debate on the emergence of a volatile 'swing voter' in place of the traditional partisan voter.

The main results of the present study are that electoral volatility in France since 1889 has depended on the traditional socio-political variables described in the literature and on the variation in the growth rate of the income per capita. However, the vote share of the incumbent does not depend on the economic growth but on unemployment. This supports the hypothesis of another type of voting shift than the pure economic voting. That tends to give credence to our theory of ideological voting in addition to a pure economic voting.

The rest of the article is structured as follows. Section 2 develops the theoretical framework. Section 3 presents the data. The empirical strategy is described in Section 4. Section 5 provides the empirical results. Section 6 concludes.

5.2 AN ECONOMIC THEORY OF ELECTORAL VOLATILITY

Our explanation of electoral volatility is based on a theory of ideological change. The basic idea of the article is that a voter confirms his vote as long as its justification costs are low. This implies that no event occurs and calls into question the underlying justification of his beliefs and values system. Ideology is defined here as the justifying part of this beliefs system. Volatility occurs when ideologies which justify political choices give birth to a phenomenon of 'cognitive dissonance' in the sense of Festinger (1957).

According to the theory of cognitive dissonance, the individual, facing new information not consistent with her beliefs system, is placed in a state of self-contradiction. To recover a state of cognitive consonance, the individual can engage in a rationalization process (Brady, Clark and Davis, 1993, p.37; Bronner, 2006, p.17). She seeks to adapt her beliefs system to new information. Yet this process is not without costs. It can explain both the inertia and the volatility of electoral choices. In this sense, electoral volatility mirrors the process of rationalization engaged in by voters. Thus volatility increases with the costs to justify past choices and thus the underlying ideologies. Individuals are led to revise their judgement to avoid having a false representation of the world. They need a 'successful or true representation of the world' (Radnitzky, 1980, 1987; Radnitzky and Bernholz, 1987). An appropriate representation limits uncertainty and improves the quality of expectation. In this sense, it is a source of efficiency. The revision or rationalization of the ideology is all the more possible as the number and range of dissonances are high.

What causes variation in the justification costs of voters' ideologies? Underlying cognitive dissonance is an event that creates discontinuity for a voter. This event can contradict, weaken and make obsolete his political ideology. It can be internal or external. Inconsistency is a cause of internal events, such as the paradox of Evil (Denzau and North, 1994, p.25). It places

individuals in a crisis of sense (Denzau and North, 1994, p.25). Mental experiment is another kind of internal event.

Conversely, external events can be civil wars (e.g. the Glorious Revolution in England in 1688), military defeats, revolutions (e.g. the French Revolution of 1789, the Russian Revolution in 1917, the Meiji Revolution in 1868), breakdowns (e.g. Eastern Europe and the USSR 1989), or military coups (e.g. Chile 1971). They can be of different magnitude and are assumed to be the cause of sudden institutional changes (Williamson, 2000, p.598) because they create generalized dissonance. Such events can be decisive in terms of electoral behaviors because they confirm or refute the ideologies of a significant part of the electorate.

Whether internal or external, these events call into question voters' political ideologies, increase their justification costs and lead them to revise their beliefs. The robustness of an ideology depends on its capacity to account for new facts and to make them consistent with an actual beliefs system. Electoral volatility is all the higher as voters' political ideologies are weak, not robust. On this basis, it is possible to assume that major social, economic and national or international political crises are at the root of variation in the justifications costs of earlier ideologies. In times of crisis, voters are led to change their votes when facing situations of social and economic unrest. Under these conditions, the success and failure of alternative political systems can also affect the justification costs of actual ideologies and foster electoral volatility.

This theoretical framework leads us to make two main predictions that will be tested in the rest of the article. The first hypothesis is that (1) a change in the national environment such as economic conditions increases the voters' ideological instability and thus the electoral volatility. The second hypothesis is that (2) a change in the national or international conditions does not affect only the votes for the incumbent as predicted by the theory of economic voting but affects the votes for all the parties, including the non governing parties.

5.3 DATA

5.3.1 BUILDING AN INDEX OF ELECTORAL VOLATILITY

Electoral volatility can be defined as the 'net electoral change between two consecutives elections' (Bartolini and Mair, 1990, p.19). Therefore, electoral periods (the period from one election to the next) are the unit of observation in the rest of our study. According to the classical aggregated electoral volatility index of Pedersen (1979), it is usually calculated by adding the absolute value of change in percentage of votes gained or lost by each party,

including the incumbent, from one election to the following one divided by two.[3] The index takes into account both the demand-driven changes in terms of voters' preferences and the supply-driven changes in terms of creations, disappearances, mergers and schisms of parties. Therefore, in a party system composed of *n* parties,

$$electoral\_volatility_t = \frac{\sum_{i=1}^{n}\{|vote_{i,t} - vote_{i,t-1}|\}}{2}$$

where *vote* is the share of the total votes received by party *i* in election *t*. The electoral volatility can vary from zero = total stability to 100 = total instability.

To build this index for France over a long period, we consider the 46 democratic elections that have taken place since 1889. We take into account the 30 legislative and constituent elections since 1889, the date at which accurate data became available, and the 16 cantonal elections since 1945, excluding by-elections with too small electorates and those not representative of the total number of voters. The index of electoral volatility is calculated by considering the difference of votes for elections of the same nature but not that between a legislative election and a cantonal one. When legislative and cantonal elections take place in the same year and we thus have two indexes, as was the case in 1967, 1973 and 1988, we use the index for legislative elections for reasons of homogeneity. The passage from the Fourth Republic before World War Two and the Vichy regime to the Fifth Republic also warranted special treatment. First, we do not calculate electoral volatility between the elections before and after the World War Two. Thus we have no index for the year 1945 even though cantonal elections and elections for the Constituent Assembly took place then. The elections for the Constituent Assembly of 1945 are taken into account to calculate the index between the election for the Constituent Assembly in 1945 and that in 1946. To calculate the index for the legislative election of 1951, however, we consider the legislative election of 1946 and not the election for the Constituent Assembly of 1946 for reasons of homogeneity. Finally, we take into account the cantonal election of 1945 to calculate the index related to the cantonal election of 1949. This method allows us to compare elections of the same type systematically.

Some difficulties also arose in calculation of the Pedersen index because of the changes, mergers and splits of political parties (Pedersen, 1979; Powell and Tucker, 2009; Sikk, 2005). The most appropriate solution is to calculate the difference between a party's vote share and

[3] The sum is divided by two to avoid double-counting because each party's gains correspond to another party's losses.

the summed vote share of its predecessor parties before a merger or its successor parties after a split (Sikk, 2005; Bartolini and Mair, 1990; Dassonneville et al., 2011, p. 13). The major difficulty, however, was establishing affiliations between parties because most parties change their names from one election to another, especially during the Third Republic and the post-World War Two period. On the basis of several historical sources (see Table 5.7 – Appendix), we established the affiliations presented in Tables 5.8, 5.9 and 5.10 – Appendix. The tables should be interpreted as follows. As shown in Table 5.10 – Appendix – focusing on the legislative elections in the Third Republic, we built seven blocks of parties. The total percentage of votes of block *i* in election *t* is given by adding the percentage of votes received in *t* by all the parties ranked as *i* in our table. Then, to calculate the index, we consider the difference of the percentage of votes received by block *i* from one election to another. Therefore, as we focus more on blocks of parties rather than individual parties, our index is an intra-block index as defined by Bartolini and Mair (1990, p. 28) rather than a pure Pedersen index.

Figure 5.1 plots the evolution of the index of electoral volatility since 1889. It appears that the French electoral volatility followed a general downward trend. It seems to be in contradiction with the findings of Bartolini and Mair (1990) who do not find any significant trend in electoral volatility for the western democracies in the period 1885-1985, especially for France from 1910. The average index is 14. The highest levels of volatility were reached at the beginning of our observation period, during the stabilization of the French democracy corresponding to the beginning of the Third Republic (Electoral-Volatility$_{1893}$= 29, EV$_{1906}$ = 31) and, to a lesser extent, at the beginning of each Republic (EV$_{1958}$ = 26 for the Fifth Republic and EV$_{1949}$ = 23, EV$_{1955}$ = 23 for the Fourth Republic). In spite of these general trends, electoral volatility remained quite erratic. Indeed, although volatility seemed to stabilize from 1960 to 1990, it increased again during the last two decades.

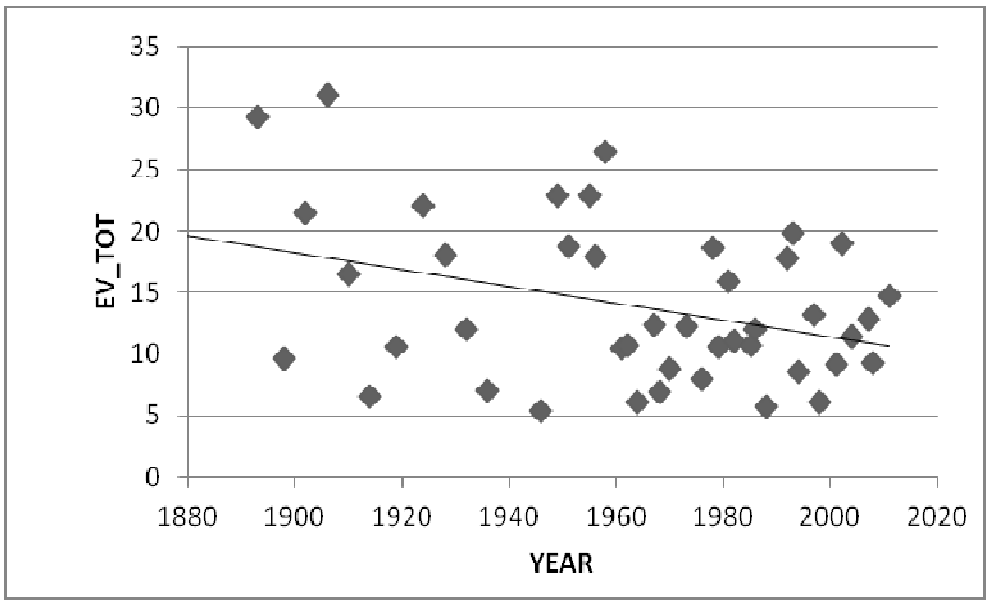

Fig. 5.1
Electoral Volatility in France 1889-2011 (Pedersen Index)

5.3.2 ECONOMIC ENVIRONMENT

Economic variables are increasingly used in the literature to explain electoral volatility, usually as mere control variables. These variables can be inflation (Remmer, 1991, Roberts and Wibbels, 1999; Mainwaring and Zoco, 2007; Madrid, 2005; Tavits 2005), the GDP growth rate (Remmer, 1991; Roberts and Wibbels, 1999; Mainwaring and Zoco, 2007) or public deficit or fiscal austerity (Nooruddin and Chiiber, 2008; Bohrer and Tan, 2000). In this paper, we use the growth rate of the real GDP per capita from Maddison's website[4], inflation and unemployment from Facchini and Melki (2011). The basic assumption is that, in time of economic crisis, i.e. low growth and high unemployment and inflation, voters revise their political beliefs and are thus led to change their votes. Our interest in considering different economic variables is to emphasize their relative importance in the electoral choice of French voters in the long run. We put aside variables related to State size and public deficit because they are difficult to interpret in our case. For instance, Nooruddin and Chiiber (2008) maintain that such variables increase electoral volatility since deficits prevent the incumbent from distributing public goods and becoming popular in the following elections.

[4] Maddison's website (http://www.ggdc.net/MADDISON/oriindex.htm): Historical Statistics of the World Economy: 1-2008 AD- Table 2: GDP levels-France GDP in million 1990 International Geary-Khamis dollars.

5.3.3 SOCIOLOGICAL VARIABLES

Vote and therefore volatility in votes is traditionally explained by sociological variables in terms of social cleavage, age or sex. First, when women were allowed to vote in 1944, they tended to vote for the right but this tendency progressively disappeared. This is usually explained by their access to the labor market and the homogenization of living conditions. However, as the date of the women's enfranchisement corresponds to a deep institutional change in France, the Fourth Republic, it seems impossible to isolate the effect of the women's vote on volatility in our study. Second, the age of voters is traditionally taken into account because young people tend to vote for leftwing parties whereas the elderly more often go for the right. This is important when we study electoral volatility, of course, but what really matters is that, according to our theory, older voters have strong political capital and stick to their electoral habits. To check the expected negative effect of the age of the electorate on volatility, we introduce a variable *age*, measuring the median age of the total population[5].

5.3.4 ELECTORAL TURNOUT

A variable of electoral turnout is generally used to test the mobilization hypothesis according to which the introduction of new or previously abstaining voters with different preferences from those of regular voters (Bartolini and Mair, 1990, p. 174) increases volatility. If, however, we focus on abstention, the phenomenon can be interpreted in another way according to our theory. Indeed, momentous events that make voters' political beliefs obsolete mean they either vote differently or decide to abstain from voting. In this case, abstention is expected to be positively correlated with volatility. To take this effect into account, we built a variable measuring the number of effective voters (*turnout*), which is derived from the same sources as those used to build the index of electoral volatility.[6]

5.3.5 INSTITUTIONS

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[5] Source: the French National Institute of Demographic Studies (Institut National d'Etudes Démographiques, INED).

[6] In the empirical analysis, we use alternative measures such as the number of people registered on the electoral lists and one referring to the rate of abstention.

Following Converse (1996) who argues that attachments to parties increased with the length of support for a party and exposure to elections, Mainwaring and Zocco (2007, p. 161) assume that "newly established party systems would become more stable over time as voters have more time to identify with parties". As Mainwaring and Zocco (2007) suggest, however, the age of democratic institutions can matter more than the mere passage of time. As Figure 5.1 suggests, we have good reasons to think that institutional change and durability influenced electoral volatility rather than the mere passage of time. To control this potential influence, we build a variable (*republic_duration*) representing the duration of each Republic. We also test a variable (*new_republic*) coded 1 for the first election following the establishment of a republic. Moreover, as our sample includes elections of different natures, we control for that with a variable (*election_type*) distinguishing the different kinds of elections. This variable is coded 1 when the election considered in our sample is a legislative election and 0 when it is cantonal election.

5.3.6 PARTY SYSTEM FRACTIONALIZATION

Since Pedersen (1983), the fragmentation of the party system has traditionally been expected to increase electoral volatility. If the parties are fragmented, there are fewer ideological differences between them and, as a consequence, voters can easily move from one party to another. An alternative explanation would be that a system with small parties resulting from high fragmentation entails less volatility because they have a strong political identity. As these parties and their voters have a high ideological specialization, they are not ready to abandon their strong political capital and to change their votes. To capture the effect of party system format, we can consider, like Bartolini and Mair (1990), simply the number of parties in each election (fragmentation). Fragmentation is more often given by the number of parties weighted by their share of votes, however. We thus calculate the index of electoral fractionalization of the party system (fragmentation_RAE) proposed by Rae (1968). Therefore, in a party system composed of n parties,

$$fragmentation\_RAE_t = 1 - \sum_{i=1}^{n} (vote_i^2)$$

where *vote* is the share of the total votes for party *i*. The index can vary from 0 = total concentration to 1 = total fractionalization.

Figure 5.2 plots the evolution of the fragmentation index since the elections of 1889. Unlike electoral volatility, party system fragmentation followed a general upward trend. It reached its highest levels after World War Two, at the beginning of the Fourth and the Fifth Republics, periods of high electoral volatility. As electoral volatility and party-system fragmentation had opposite evolutions, however, we can expect the fractionalization index to have a negative coefficient in the regressions[7].

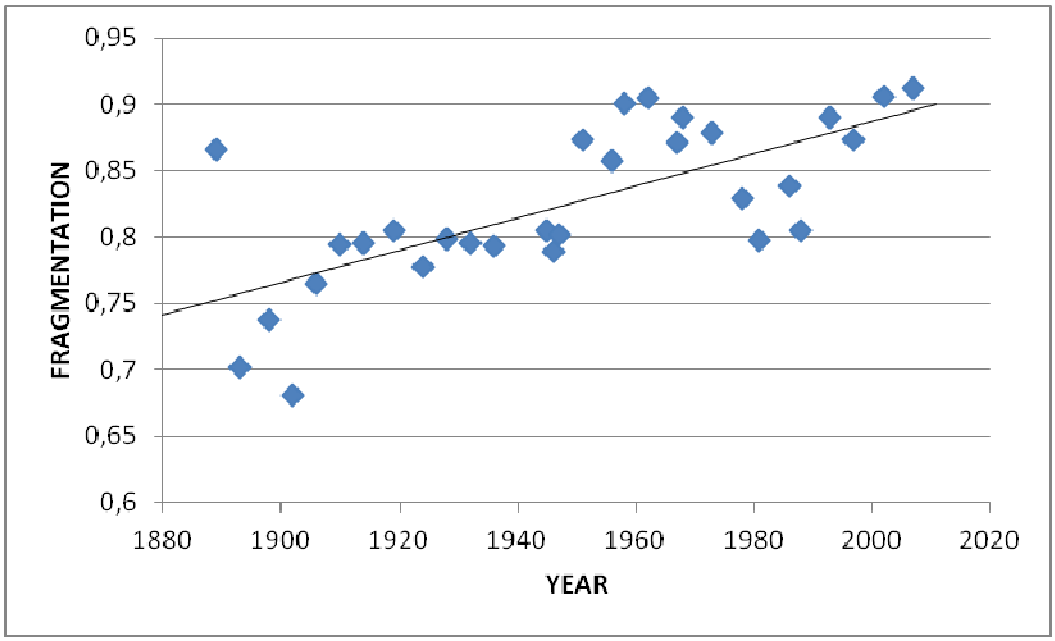

Fig. 5.2
Political Fragmentation in France 1889-2011 (Rae Index)

5.3.7 VOTER PUNISHMENT OF THE INCUMBENT

The incumbent punishment hypothesis of the theory of economic voting has progressively emerged in the literature on electoral volatility (Remmer 1991; Mainwaring and Zoco, 2007; Nooruddin and Chiiber, 2008). As it is essential in our study to know which part of total electoral volatility is determined by changes in votes for the incumbent, we include a variable measuring the variation of the vote share for the incumbent in our model. The variable *incumbent_votes* provides the vote share received by the incumbent party, so that the first

[7] We also use traditional alternative measure of the effective number of parties measured in vote share (Laakso and Taagepera, 1979). In a party system composed of *n* parties, the index is calculated as follows:

difference of the variable provides the incumbent's return rate.[8] The correlation between the absolute value of the change in the incumbent vote share and our index of electoral volatility is 0.18. This makes us confident that electoral volatility does not merely reflect the incumbent's return rate.

5.4. RESULTS

5.4.1 UNIT ROOT

As we deal with macroeconomic variables over time, the possibility of spurious regressions, rarely considered in empirical studies of electoral volatility, arises owing to the potential integration and/or cointegration of variables. If we consider the time elapsing between two elections as the observation unit, we can implement a unit root test (Augmented Dickey Fuller) with an appropriate trend, *T*, to investigate the stationarity status of each variable. This test is performed by estimating a model including a trend and a constant, given by equation (1) or only a constant, given by equation (2):

$$\Delta y_t = \alpha + \rho y_{t-1} + \beta T + \sum d_s \ \Delta y_{t-s} + \varepsilon_t \quad (1)$$

$$\Delta y_t = \alpha + \rho y_{t-1} + \sum d_s \ \Delta y_{t-s} + \varepsilon_t \quad (2)$$

Where y_t is the relevant time series, *T* is a time trend that takes into account the number of years elapsing between two observations/elections, ε_t is a residual term.

Tables 5.1 and 5.2 provide the unit root test results on the levels and the first differences of the variables, respectively. They support the hypothesis that all variables are stationary in level except the series *age* and *unemployment*. For these two variables, the null hypothesis of a unit root can be rejected at only 10% but not at 5%. Therefore, the dependant variable *electoral volatility* is stationary in level as well as the first differences of the independent variables of our model. Therefore, being integrated of the same order, electoral volatility in level the independent variables in first difference, can enter the regressions without any

[8] In the light of different assumptions of government responsibility discussed in the literature on economic voting, we built other indexes measuring the incumbent's vote share. We construct a dummy variable coded zero in *t* when the incumbent rightwing or leftwing block (i.e. the incoming block in *t-1*) loses elections in *t* and coded one otherwise. We also use a variable that gives in *t* the variation of the percentage of votes received by the incumbent rightwing or leftwing block between elections in *t* and *t-1*.

concerns of spurious regressions. Moreover, it is worth noting that the tests do not reveal that that variable *electoral_volatility* is trend stationary. This information tends to confirm Bartolini and Mair (1990) and Dassonneville and Hooghe (2001) who do not find any significant trend in electoral volatility in Western Europe for the periods 1885-1985 and post-1945, respectively.

Table 5.1
Unit root tests on the levels of the variables

Variable	Deterministic component	ADF	k
electoral_volatility	constant, trend	-6.368***	0
age	constant, trend	-3.471*	5
turnout	constant, trend	-10.65***	0
fragmentation	constant, trend	-5.387***	0
growth of real per capita income	constant	-5.276***	0
unemployment	constant, trend	-3.477*	6
inflation	constant	-4.475***	1
incumbent_votes	constant	-5.374***	0

Notes: (1) The tests are performed on the levels of the variables. (2) k indicates the lag length chosen according to the Schwarz information criterion. (3) * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5.2
Unit root tests on the first differences of the variables

Variable	Deterministic component	ADF	k
Δ(electoral_volatility)	constant	-4.682***	3
Δ(age)	constant	-4.443***	0
Δ(turnout)	constant	-7.671***	3
Δ(fragmentation)	constant	-8.082***	1
Δ(unemployment)	constant	-3.559**	0
Δ(incumbent_votes)	constant	-5.453***	3

Notes: (1) The tests are performed on the first log-differences of the variables. (2) k indicates the lag length chosen according to the Schwarz information criterion. (3) * significant at 10%; ** significant at 5%; *** significant at 1%.

5.4.2 REGRESSION RESULTS

To investigate to what extent the determinants of electoral volatility differ from the determinants of the change in the incumbent's vote share, we run different battery of regressions. A first one studies the determinants of total electoral volatility. A second one studies the determinants of the incumbent return rate. A main difficulty comes from the small number of observations that does not exceed 43. To keep a sufficient number of freedom degrees, we investigate sequentially two different sets of factors explaining electoral volatility: the institutional factors and the socio-political factors. In all the following regressions, we estimate with an OLS method, time-series data for 46 elections held in France between 1889 and 2011. We systematically perform a Jarque-Bera test to make sure that the error terms follow a normal distribution and that the estimate results do not depend on some outliers. We also perform a Box-Pierce test to make sure that the error terms are not auto-correlated. In the presence of serial auto-correlation of the error-terms, an autoregressive term is included into the regressions.

A four-variable model, in which we include *republic_duration*, *new_republic*, *republic*, *election_type*, is first estimated to test the effects of political institutions on total electoral volatility. As shown in Table 5.3, the institutional variables perform poorly in explaining electoral volatility. Only the variable *republic* reaches a reasonable level of significance. Indeed, the coefficient of this variable is negative and statistically significant at the 10% level. This implies that the volatility level was higher under the early republics, the 3rd and 4th Republics, than under the 5th Republic. This suggests that volatility depends on specific features to each Republic (voting system, instability of the government), which are specified in our model. The instability of governments under the 3rd Republic may be a good candidate for explaining the higher electoral volatility under this period. However, as shown in Table 5.3, the duration of each republic as well as the establishment of a new republic do not explain electoral volatility. Moreover, *election_type* does not reach significance. Therefore, the different nature of elections (legislative/cantonal) included in our sample does not explain electoral volatility. In short, the institutional setting of each republic seems to have played a role in the evolution of electoral volatility, although we are not able to clearly identify which feature of each republic has mattered. In the rest of the analysis, we only keep the variable *republic* in the following specifications.

Table 5.3
Electoral Volatility and institutions, 1889-2011

	electoral volatility (1889-2011)
constant	25.928*** [8.437]
republic_duration	-0.042 [0.053]
new_republic	3.731 [6.509]
republic	-2.666* [1.508]
election_type	0.996 [1.848]
R^2	0.200

Notes: (1) N = 43 elections. (2) White-corrected standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) No outlier.

Then, we estimate a 3-variable model including the traditional socio-political variables explaining electoral volatility, that is to say the ageing of the electorate, Δ*(age)*, the variation in turnout Δ*(turnout)*, the variation in party-system fragmentation Δ*(fragmentation)*. The estimates result is shown in Table 5.4, column 1. We can notice that all variables reach a reasonable level of significance. The ageing of the electorate has the expected negative impact on electoral volatility. Party-system fragmentation, measured as the total number of parties, has a positive and statistically significant but at only 10% impact on volatility[9]. An increase in turnout has the expected effect of increasing volatility[10]. Therefore all these variables are kept in the following specifications.

[9] We also tested the effects of other common measures of party-system fragmentation: the indexes of political fragmentation (Rae, 1968) and of the effective number of parties (Laasko and Taagepera, 1979). Quite surprisingly, the coefficients of these indexes do not reach any reasonable level of significance (for reasons of clarity, the results of these regressions are not presented here). Bartolini and Mair (1990) provide us with an explanation of the absence of effect of these indexes. Indeed, indexes capturing the number of parties weighted by their share of votes amounts to an index providing the number of major parties. Although this measure is adapted to explain volatility in a two-party system, it is not the case in a multi-party one such as the French one.
[10] Alternative measures of turnout such as the number of registered citizens and the abstention rate have the same effect although the regressions results are not reported here.

Table 5.4
Electoral Volatility, 1889-2011

	electoral volatility (1889-2011)				
	(1)	(2)	(3)	(4)	(5)
constant	14.449*** [0.908]	24.033*** [4.459]	27.389*** [5.328]	29.448*** [6.360]	21.293*** [4.652]
Δ(age)	-5.416*** [1.362]	-3.985** [1.571]	-4.614** [2.030]	-4.249** [1.873]	-4.266* [2.146]
Δ(fragmentation)	2.201* [1.157]	2.006** [0.868]	1.817* [0.919]	1.636** [0.610]	1.477 [0.899]
Δ(turnout)	1.42E-07** [5.10E-08]	1.49E-07*** [4.65E-08]	1.51E-07*** [5.23E-08]	1.43E-07*** [5.03E-08]	1.34E-07** [5.83E-08]
republic	-	-2.271** [0.970]	-2.938** [1.126]	-3.325** [1.362]	-1.697 [1.010]
Δ(growth of real per capita income)	-	-21.237*** [3.739]	-	-	-37.393* [19.286]
Δ(inflation)	-	-	-0.095 [0.108]	-	0.109 [0.208]
Δ(unemployment)	-	-	-	0.192 [0.826]	0.066 [0.776]
R^2	0.408	0.600	0.396	0.407	0.627

Notes: (1) N = 42 elections. (2) Heteroskedastic Whyte type standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the year 1906 that appears as an outlier.

Thus, the benchmark specification or our model includes the 4 variables, *republic*, Δ*(age)*, Δ*(turnout)*, Δ*(fragmentation)*. To investigate the economic determinants of electoral volatility, we add sequentially different economic variables to the benchmark model. Column 2 of Table 5.4 reports the estimates result of the model including the variation of the growth of the real per capita income. The variable is statistically significant at the 1% level and the predicted negative impact on electoral volatility. This effect is robust when including the other economic variables, the variation in inflation and unemployment, as shown in column 5. The coefficient of the change in the growth of real per capita income remains significant at the 6% level. In addition, the change in inflation and unemployment does not impact volatility, according to columns 3, 4 and 5. The absence of influence of inflation contrasts with other studies, mainly on Latin America, where inflation increases electoral volatility (Remmer, 1991; Mainwaring and Zoco, 2007). That can be explained by the absence of *hyper-inflation* for a long period in France, differently from Latin America. However, the influence of a

change in economic growth can be due to the effect of the economic environment on the changes in the incumbent's vote share.

We now conduct a test to make sure that the effect of economic growth on electoral volatility that we find is not only mediated through the effect of the economic growth on the incumbent's return rate, as predicted by the theory of economic voting. For that, we propose a straightforward test. Column 1, Table 5.5 reports the estimate our benchmark model including the variable of economic growth. If the effect of this variable is only due to its effect on the incumbent's return rate, then including the incumbent's return rate in the benchmark model should remove the effect of the growth variable on electoral volatility. Column 2, Table 5.5 reports the result of the benchmark model including the variation of the incumbent's vote share, i.e. the incumbent's return rate. We notice that the effect of the growth variable is robust to the inclusion of the incumbent's return rate. Moreover, the magnitude and the t-statistics of the growth of real per capita income are reinforced in column 2. This supports the hypothesis that the growth variable affects the total electoral volatility, given the effect of the growth variable on the incumbent's return rate. As a consequence, this provides evidence of our hypothesis of an ideological voting, different from a pure economic voting. Moreover, the variable measuring the change in the incumbent votes is not significant. This suggests that the variation in the incumbent's votes is not a major dimension of the variation in total votes.

In a last set of tests, we more directly investigate the determinants of the incumbent's return rate. To explain the incumbent's return rate, we include the variable measuring the change in fragmentation, the change in turnout, and the *republic* variable capturing the effect of potential changes in the electoral rules and constituencies. In addition, because of problems of serial correlations, the following regressions include an autoregressive term. The test results are presented in Table 5.6. Columns 2 and 4 show that the change in the growth of real per capita income and the change in inflation does not impact the change in the incumbent votes share. However, the change in unemployment significantly decreases the incumbent's return rate (column 3). This effect is robust when including the economic variables all together in the model. This last finding is in line with the empirical literature on vote functions. More interesting for us, our finding supports that changes in economic environment can have different effects on the vote share for the incumbent and for other parties. While the incumbent's return rate is affected by the change in unemployment, the return rate for the non-governing parties and for all parties in general is affected by fluctuations in the growth or real per capita income.

Table 5.5
Electoral Volatility and incumbent's votes, 1889-2011

	electoral volatility (1889-2011)	
	(1)	(2)
constant	24.03*** [4.455]	21.36*** [4.307]
Δ(age)	-3.985** [1.571]	-4.125** [1.749]
Δ(fragmentation)	2.006** [0.868]	0.891 [0.765]
Δ(turnout)	1.49E-07*** [4.65E-08]	1.72E-07*** [4.25E-08]
republic	-2.271** [0.970]	-1.693* [0.918]
Δ(growth of real per capita income)	-21.23*** [3.739]	-23.246*** [7.353]
Δ(incumbent_votes)	-	-0.067 [0.069]
R^2	0.600	0.599

Notes: (1) N = 42 elections. (2) Heteroskedastic Whyte type standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (3) We control for the year 1906 that appears as an outlier.

Table 5.6
Incumbent's votes, 1889-2011

	Δ(incumbent_votes)				
	(1)	(2)	(3)	(4)	(5)
constant	-2.299 [9.658]	-2.794 [9.981]	-4.778 [12.383]	-2.924 [9.806]	-1.346 [11.819]
Δ(fragmentation)	-4.727** [2.002]	-4.753** [2.043]	-5.193** [2.001]	-5.273** [2.045]	-6.522** [2.426]
Δ(turnout)	2.45E-07* [1.43E-07]	2.30E-07 [1.43E-07]	2.09E-07 [1.38E-07]	2.41E-07 [1.54E-07]	2.72E-07* [1.60E-07]
republic	0.602 [2.137]	0.779 [2.205]	1.354 [2.633]	0.790 [2.169]	0.678 [2.528]
Δ(growth of real per capita income)		17.447 [19.502]			59.834 [40.475]
Δ(unemployment)			-2.629** [1.023]		-2.560** [1.043]
Δ(inflation)				-0.147 [0.191]	-0.447 [0.367]
R^2	0.522	0.539	0.576	0.539	0.608

Notes: (1) N = 40 elections. (2) The equations include an autoregressive term to avoid problems of serial correlation. (3) Heteroskedastic Whyte type standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. (4) No outlier.

5.5 CONCLUSION

In recent years, the electoral fortunes of incumbent have focused much attention in academic research. The present paper suggests that, although it is an important issue, the determinants of electoral behaviour cannot be properly understood without taking into account the vote share for non governing parties. An analysis of the elections in France from 1889 to 2011 reveals that the aggregated electoral volatility has strongly depended on the economic environment along with traditional socio-political variables. We provide evidence that the fluctuations of the economic environment have not affected the vote shares for the incumbent and for other parties.

In addition, as part of the convergence process occupying political economy on the issue of electoral behavior, this article proposed an alternative theory of voting to the pure economic voting. Indeed, we argue empirically and theoretically that economic voting based on the incumbent's punishment can only account for a limited part of voting patterns. The economic fluctuations determine the vote share received by parties other than the incumbent. The

limitations of the economic voting theory stem from the fact that this theory neglects some of the costs inherent in electoral behaviour.

To cope with this limitation, we proposed an explanation of the voting patterns based on the voters' ideological instability. This instability is reflected in the phenomenon of electoral volatility. The core of this theory is the concept of 'justification costs' in the determination and change of ideologies. The basic idea is that, in the presence of a change in the environment, individuals' system of interpretation of the world will be adapted to justify and explain it. Otherwise, the event increases the justification costs and can drive individuals to change their ideology and their vote. According to an individualist and subjectivist theory or belief formation, events should not affect in the same way the whole of the electorate, especially the rightwing and the leftwing voters. Incidentally, the article raises an issue hitherto unexplored by studies on electoral volatility: the fundamental need to explore the specific determinants of volatility inside rightwing and leftwing blocks. That opens up new perspectives on the study of electoral volatility in particular and on electoral behaviours generally.

APPENDIX

Table 5.7
Description and Source of Variables

Variable	Definition	Source
age	median age of total population	INED (institut national d'études démographiques)
electoral volatility	sum of the absolute values of change in percentage of votes gained or lost by each party from one election to the following one divided by two	Website of the French National Assembly Laurent de Boissieu' s website Goguel (1946)
fragmentation	Total number of parties	see: electoral volatility
growth	real GDP per capita growth rate	Maddison's website National accounts- INSEE (National Institute of Statistics and Economic Studies)
incumbent votes	vote shares received by the incumbent party	see: electoral volatility
inflation	inflation rate	Thomas Piketty's website OECD website
new republic	dummy variable coded one for the first two elections of each Republic and zero for the other elections	own calculation
republic duration	Variable counting of the time elapsed from the establishment of a new Republic	own calculation
republic	variable coded 3 for the years of the 3rd Republic, 4 for the years of the 4th Republic and 5 for the years of the 5th Republic	own calculation
turnout	effective number of voters	see: electoral volatility
election type	Dummy variables coded one for the legislative elections and zero for the cantonal elections	own calculation
unemployment	unemployment rate	Villa (1994) INSEE (National Institute of Statistics and Economic Studies)

Table 5.8
Parties' Affiliations in the Legislative Elections under the Third Republic

	1889	*1893*	*1898*	*1902*	*1906*	*1910*	*1914*	*1919*	*1924*	*1928*	*1932*	*1936*
Section Française de l'Internationale Communiste/ Communistes	-	-	-	-	-	-	-	-	*1*	*1*	*1*	*1*
Socialistes	*2*	*2*	*2*	-	-	-	-	*2*	*2*	*2*	*2*	*2*
Socialistes Révolutionnaires	-	-	-	*2*	-	-	-	-	-	-	-	-
Socialistes réformistes	-	-	-	*2*	-	-	-	-	-	-	-	-
Section Française de l'Internationale Ouvrière	-	-	-	-	*2*	*2*	*2*	-	-	-	-	-
Divers Gauche	-	-	-	-	-	-	-	-	-	*2*	*2*	*3*
Radicaux-Socialistes	-	*3*	*3*	-	-	-	-	-	-	-	-	-
Socialistes Indépendants	-	-	-	-	*3*	-	-	*3*	*3*	*3*	-	-
Parti Républicain Radical	-	-	-	-	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Républicains Socialistes	-	-	-	-	-	*3*	*3*	*3*	*3*	*3*	*3*	-
Radicaux	-	*4*	*4*	-	-	-	-	-	-	-	-	-
Parti Républicain Radical et Radical Socialiste	-	-	-	*4*	-	-	-	-	-	-	-	-
Radicaux Indépendants	-	-	-	-	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*
Républicains de gauche	-	-	-	-	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*
Démocrates Populaires	-	-	-	-	-	-	-	-	-	-	*4*	*4*
Républicains	*5*	-	-	-	-	-	-	-	-	-	-	-
Républicains Progressistes	-	*5*	*5*	-	-	-	-	-	-	-	-	-
Action Libérale Populaire	-	-	-	*5*	*5*	*5*	-	-	-	-	-	-
Union Républicaine	-	-	-	-	-	*5*	*5*	*5*	*5*	*5*	*5*	*5*
Monarchistes (conservateurs)	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-
Ralliés	-	*6*	*6*	-	-	-	-	-	-	-	-	-
Réactionnaires	-	-	-	*6*	*6*	*6*	*6*	-	-	-	-	-
Indépendants	-	-	-	-	-	-	-	*6*	*6*	*6*	*6*	*6*
Conservateurs	-	-	-	-	-	-	-	*6*	*6*	*6*	*6*	*6*

Nationalistes (Révisionnistes, Boulangistes, Socialistes Révisionnistes, Antisémites, Démocrates Chrétiens)	*7*	*7*	*7*	-	-	-	-	-	-	-	-	-
Anciens Combattants	-	-	-	-	-	-	-	*7*	-	-	-	-

Table 5.9
Parties' Affiliations in the Legislative Elections under the Fourth and Fifth Republics

	1945 C	*1946 C*	*1946 L*	*1951*	*1956*	*1958*	*1962*	*1967*	*1968*	*1973*	*1978*	*1981*	*1986*	*1988*	*1993*	*1997*	*2002*	*2007*
Parti Communiste Français (et apparentés)	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Parti Communiste Internationaliste	-	*1*	*1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union Républicaine et Résistante	-	*1*	*1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Extrême Gauche (et divers)	-	-	-	*1*	*1*	-	*1*	*1*	*1*	-	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Union Progressiste	-	-	-	-	*1*	-	-	-	-	-	-	-	-	-	-	-	-	-
Union des Forces Démocratiques (/Radicaux UFD)	-	-	-	-	-	*1*	-	-	-	-	-	-	-	-	-	-	-	-
Parti Socialiste Unifié	-	-	-	-	-	-	*1*	*1*	*1*	*1*	-	-	-	-	-	-	-	-
Lutte Ouvrière	-	-	-	-	-	-	-	-	-	*1*	-	-	-	-	-	-	-	-
Autres Trotskistes	-	-	-	-	-	-	-	-	-	*1*	-	-	-	-	-	-	-	-
Ligue Communiste Révolutionnaire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*1*	*1*
Section Française de l'Internationale Ouvrière	*2*	*2*	*2*	*2*	*2*	*2*	*2*	-	-	-	-	-	-	-	-	-	-	-
Fédération de la Gauche Démocrate et Socialiste	-	-	-	-	-	-	-	*2*	*2*	-	-	-	-	-	-	-	-	-
Parti Socialiste	-	-	-	-	-	-	-	-	-	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
Radicaux- Union Démocratique et Socialiste de la Résistance	*3*	-	-	*3*	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-
Rassemblement des Gauches Républicaines	-	*3*	*3*	*3*	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-

Divers Gauche	-	*3*	-	*3*	*3*	-	-	-	-	*3*	*3*	*3*	*3*	-	-	*3*	*3*	*3*
Radicaux Socialistes	-	-	-	-	-	*3*	*3*	*3*	*3*	-	-	-	-	-	-	-	-	-
Mouvement des Radicaux de Gauche	-	-	-	-	-	-	-	-	-	*3*	*3*	-	-	-	-	-	-	-
Radicaux de Gauche	-	-	-	-	-	-	-	-	-	-	-	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Ecologistes (et divers)	-	-	-	-	-	-	-	-	-	-	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*
Les Verts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*4*	-	*4*	*4*
Mouvement Républicain Populaire	*5*	*5*	*5*	*5*	*5*	*5*	*5*	-	-	-	-	-	-	-	-	-	-	-
Radicaux Centristes	-	-	-	-	-	*5*	*5*	*5*	*5*	-	-	-	-	-	-	-	-	-
Union Démocratique et Socialiste de la Résistance (minoritaires)	-	-	-	-	-	*5*	-	-	-	-	-	-	-	-	-	-	-	-
Centre Démocrate	-	-	-	-	-	-	-	*5*	*5*	-	-	-	-	-	-	-	-	-
Centre Progrès et Démocratie Moderne	-	-	-	-	-	-	-	-	*5*	-	-	-	-	-	-	-	-	-
Mouvement Réformateur	-	-	-	-	-	-	-	-	-	*5*	-	-	-	-	-	-	-	-
Union pour la Démocratie Française	-	-	-	-	-	-	-	-	-	-	*5*	*5*	*5*	*5*	*5*	*5*	*5*	-
Mouvement Démocrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*5*
Divers Droite	*6*	*6*	*6*	-	-	-	-	-	-	*8*	-	*8*	*8*	*8*	*8*	*8*	*8*	*8*
Républicains Indépendants	*6*	*6*	*6*	-	-	-	*6*	*6*	*6*	*6*	-	-	-	-	-	-	-	-
Parti Paysan	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parti Républicain de la Liberté	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union Gaulliste	-	-	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centre National des Indépendants (et paysans)	-	-	-	*6*	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-	-	-
Républicains et Indépendants Français	-	-	-	*6*	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-
Rassemblement du Peuple Français	-	-	-	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Républicains Sociaux	-	-	-	-	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-
Modérés	-	-	-	-	-	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-	-
Centre de la Réforme Républicaine	-	-	-	-	-	*6*	-	-	-	-	-	-	-	-	-	-	-	-
Divers Gaullistes	-	-	-	-	-	*6*	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-

Union pour la Nouvelle République /Union Démocratique du Travail	-	-	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-
Union des Démocrates pour la Ve République	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-
Union pour la Défense de la République (et alliance avec Républicains Indépendants)		-	-	-	-	-	-	-	6	6	-	-	-	-	-	-	-	-
Centre Démocrate et Progrès	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-
Rassemblement pour la République	-	-	-	-	-	-	-	-	-	-	6	6	6	6	6	6	-	-
Union pour un Mouvement Populaire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	6
Extrême Droite (et divers)	-	-	-	-	7	7	7	7	7	7	7	7	7	7	7	7	7	-
Union et Fraternité Française (Poujadistes)	-	-	-	-	7	7	7	-	-	-	-	-	-	-	-	-	-	-
Alliance Républicaine	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-
Front National	-	-	-	-	-	-	-	-	-	-	7	7	7	7	7	7	7	7
Mouvement National Républicain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	7
Rassemblement Pour la France	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-
Régionalistes	-	-	-	-	-	-	-	8	-	-	8	-	8	8	8	-	8	8
Chasse Pèche Nature et Tradition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8
Divers	8	8	8	8	8	8	8	-	-	8	8	-	8	-	8	8	8	8

Table 5.10

Parties' Affiliations in the Cantonal Elections under the Fourth and Fifth Republics

	1945	*1949*	*1955*	*1961*	*1964*	*1967*	*1970*	*1973*	*1976*	*1979*	*1982*	*1985*	*1988*	*1992*	*1994*	*1998*	*2001*	*2004*	*2008*	*2011*
Parti Communiste Français (et apparentés)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Extrême Gauche (et apparentés)	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Parti Socialiste Unifié	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Section Française de l'Internationale Ouvrière	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fédération de la Gauche Démocrate et Socialiste	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parti Socialiste	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Union Démocratique et Socialiste de la Résistance-Mouvement de Libération Nationale	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Radicaux Socialistes	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Républicains Socialistes	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Socialistes Indépendants	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indépendants de Gauche	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rassemblement des Gauches Républicaines	-	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radicaux	-	-	*3*	*3*	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centre Gauche	-	-	*3*	*3*	*3*	-	-	-	*5*	-	-	-	-	-	-	-	-	-	-	-
Divers Gauche	-	-	*3*	-	-	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Radicaux de Gauche	-	-	-	-	-	-	-	*3*	*3*	-	-	-	-	-	-	-	-	-	-	-
Mouvement des Radicaux de Gauche	-	-	-	-	-	-	-	-	-	*3*	*3*	*3*	*3*	*3*	*3*	-	-	-	-	-
Parti Radical de Gauche	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*3*	*3*	*3*	*3*	*3*
Mouvement Des Citoyens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*3*	*3*	*3*	-	-
Ecologistes (et divers)	-	-	-	-	-	-	-	-	-	*4*	*4*	*4*	*4*	-	-	*4*	*4*	*4*	*4*	*4*
Génération Ecolo	-	-	-	-	-	-	-	-	-	-	-	-	-	*4*	*4*	-	-	-	-	-
Les Verts (et Europe Ecologie)	-	-	-	-	-	-	-	-	-	-	-	-	-	*4*	*4*	*4*	*4*	*4*	*4*	*4*
Mouvement Républicain Populaire	*5*	*5*	*5*	*5*	*5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Républicains de Gauche et Alliance Démocrate	*5*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centre Démocratie	-	-	-	-	-	*5*	*5*	-	*5*	-	-	-	-	-	-	-	-	-	-	-
Centre Démocratie et Progrès	-	-	-	-	-	-	*5*	*5*	*5*	-	-	-	-	-	-	-	-	-	-	-
Réformateurs	-	-	-	-	-	-	-	*5*	-	-	-	-	-	-	-	-	-	-	-	-
Union pour la Démocratie Française	-	-	-	-	-	-	-	-	-	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	-	-
Mouvement Démocrate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*5*	*5*
Centre Droit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*5*	-
Indépendants de Droite	*6*	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Entente Républicaine	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conservateurs	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Républicains Indépendants	-	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indépendants	-	*6*	-	-	-	-	-	-	*6*	-	-	-	-	-	-	-	-	-	-	-
Parti Républicain de la Liberté	-	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Action Locale	-	-	*6*	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Centre National des Indépendants (et paysans)	-	-	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Modérés	-	-	*6*	-	-	*6*	*6*	*6*	*6*	*6*	-	-	-	-	-	-	-	-	-	-
Divers Droite	-	-	-	-	-	-	-	-	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Radicaux Indépendants	*7*	-	-	-	*7*	*7*	*7*	*7*	*7*	-	-	-	-	-	-	-	-	-	-	-
Fédération Républicaine et Union des Démocrates pour la République	*7*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rassemblement du Peuple Français	-	*7*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union pour la Nouvelle République /Union Démocratique du Travail	-	-	*7*	*7*	*7*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union des Démocrates pour la Ve République	-	-	-	-	-	*7*	*7*	-	-	-	-	-	-	-	-	-	-	-	-	-
Union pour la Défense de la République (et alliance Républicains Indépendants)	-	-	-	-	-	-	-	*7*	*7*	-	-	-	-	-	-	-	-	-	-	-
Rassemblement pour la République	-	-	-	-	-	-	-	-	-	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	-	-	-
Rassemblement Pour la France	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*7*	-	-	-
Union pour un Mouvement Populaire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*7*	*7*	*7*
Front National	*8*	-	-	-	-	-	-	-	-	-	-	-	*8*	*8*	*8*	*8*	*8*	*8*	*8*	*8*
Extrême Droite (divers)	-	*8*	*8*	*8*	*8*	*8*	*8*	-	-	-	*8*	*8*	*8*	*8*	*8*	*8*	-	*8*	*8*	*8*
Mouvement National Républicain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*8*	-	-	-
Régionalistes	-	-	-	-	-	-	-	-	-	-	-	-	*9*	*9*	*9*	-	*9*	*9*	*9*	*9*
Chasse Pèche Nature et Tradition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*9*	*9*	-	-
Autres	*9*	-	*9*	*9*	-	-	-	-	-	-	-	-	-	-	*9*	*9*	*9*	*9*	*9*	*9*

GENERAL CONCLUSION

The purpose of this dissertation was to investigate the direct and indirect interactions between ideology and economic growth over the French democratic experience.

Essay 1 provided a review of the economic literature on the topic of ideology. It allowed to position this dissertation in the existing literature and was also the opportunity to take stock of the theoretical and empirical treatment of ideology. This essay showed that the economic effects of the political ideology have given rise to a plethora of research. In this regard, this dissertation takes part in a prolific research question but with an original insight since only a few studies have tackled the issue of the effects of political ideology on the long-run economic growth. This first essay also showed that the works on ideology have increasingly studied the determinants of ideology and more generally of the emergence and persistence of beliefs.

In this regard, this dissertation participates in another research over the shaping of the individuals' beliefs. In this line, we provided with essays 4 and 5 an original perspective by investigating not only the effects of the economy on the votes along a right-left axis but also on the voters' ideological instability.

More precisely, the main purpose of this dissertation was to determine the growth effect of the individuals' political ideology. For that, we investigated deeply the transmission mechanisms from ideology to economic growth. We focused our intention on the channel of the level of government intervention in the economy. We defined government intervention as the size of the government measured by the share of total public spending in output. To study properly the different steps of the transmission mechanism between ideology, government size and economic growth, essays 2 and 3 decomposed the study of the overall relationship. This decomposition allowed an accurate investigation of the possible changing relationship between ideology and government on the one hand, and between government size and economic growth on the other hand. Essay 2 focusing on the government size-economic output relationship in France in the 20^{th} century provided the following findings. The effect of government size on the economic output is not straightforward but follows a nonlinear

pattern. In other words, an increase in the size of government has a positive effect on output only to a certain extent. We determined that the output-maximising government size was 30% of the GDP. This suggest that governments that increase the share of public expenditure experience in average an increase in output only if this share is below 30% of the GDP.

Essay 3 focused on the transmission mechanism between voters' ideology and the size of government in democratic countries all over the 20th century: France, the U.S. and the U.K.. This essay supplied us with several lessons for the purpose of this dissertation. First, a shift of the voters' ideology towards the left increases in the long run the size of government in France in the post-second-world-war period but has no effect in the pre-war period. Moreover, this post-war effect of ideology is peculiar to France since we did not find such evidence for the U.S. and the U.K.. Furthermore, we provided a new framework based on Baumol (1967) to study the effect of the increasing public sector's costs on the growth of government. This framework showed theoretically that the influence on government size of the public sector's costs increase when a society becomes more leftwing. In fact, we provided some evidence for France supporting that the effect of the costs is conditional to the country's ideology, defined as the country's choice for the appropriate level of government intervention in the economy.

Essays 2 ad 3 could suggest that, if the growth of government has negatively impacted the output in the post-war period and a move of the ideology to the left has increased the size of government size in this period, then a move of the ideology to the left could have a negative impact on output through the channel of government intervention. However, such an assertion needed an appropriate setting to be empirically supported. This was the purpose of essay 4 that investigated more directly the ideology-growth relationship. This essay focused on the voters' ideology on the long run economic growth and possible reverse causality. This essay empirically supported that a move to the left has had a negative effect of economic growth all over the French democratic experience since the end of the 19th century. More precisely, this effect is mediated by the voters' preferences regarding the level of government intervention in the economy for the post-second-world-war period but not for the pre-war period. For the pre-war period, the negative effect of a move of the voters' ideology to the left can be explained by a direct of the voters' norms regarding labor or saving behaviors. This essay showed that this relationship does not suffer from endogeneity bias. In other words, economic growth has not fostered the votes for leftwing or rightwing parties.

In essay 5, we argued that, although economic growth has not influenced the votes along a right-left axis, it can have influenced voting patterns in general yet. In other words, economic events can have modified the voters' worldview irrespective of their partisan affiliation. This

can be reflected in the volatility of the vote shares for all parties, i.e. the electoral volatility. We found robust evidence for this argument with data on 46 elections held in France since the late 19th century. This can interpreted as an impact of the economic environment on the voters' ideological instability. This provides an original perspective for research over the influence of economic growth on individuals' ideology. Further research could investigate if the economic environment has different effects on the vote shares for leftwing and rightwing parties. So far, this question has never been addressed by the previous literature and could valuable information on the individuals' voting patterns by taking into account the diversity of the voters' worldviews.

More generally, this dissertation and the looming literature on the growth effect of ideology call for additional research on the transmission channels between ideology and economic growth. Indeed, the size of government does not appear an appropriate channel for the whole of the period studied in this dissertation. One potential limit of the present work is the focus on only one transmission mechanism. Therefore, additional studies could study the possibility for ideology to have worked on output through other channels such as the regulation of the labor market as suggested by Bjornskov and Potrafke (2012). This dissertation could also lead to similar studies on other countries for long periods of time. The database constructed for essay 3 allows similar investigations for the U.S. and the U.K..

In spite of the several limits of our works and the unanswered questions, we believe that we provide interesting answers and also that the questions we raise are as many alleys for future researches in this exciting topic.

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